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S. A. E. Midwinter Meeting

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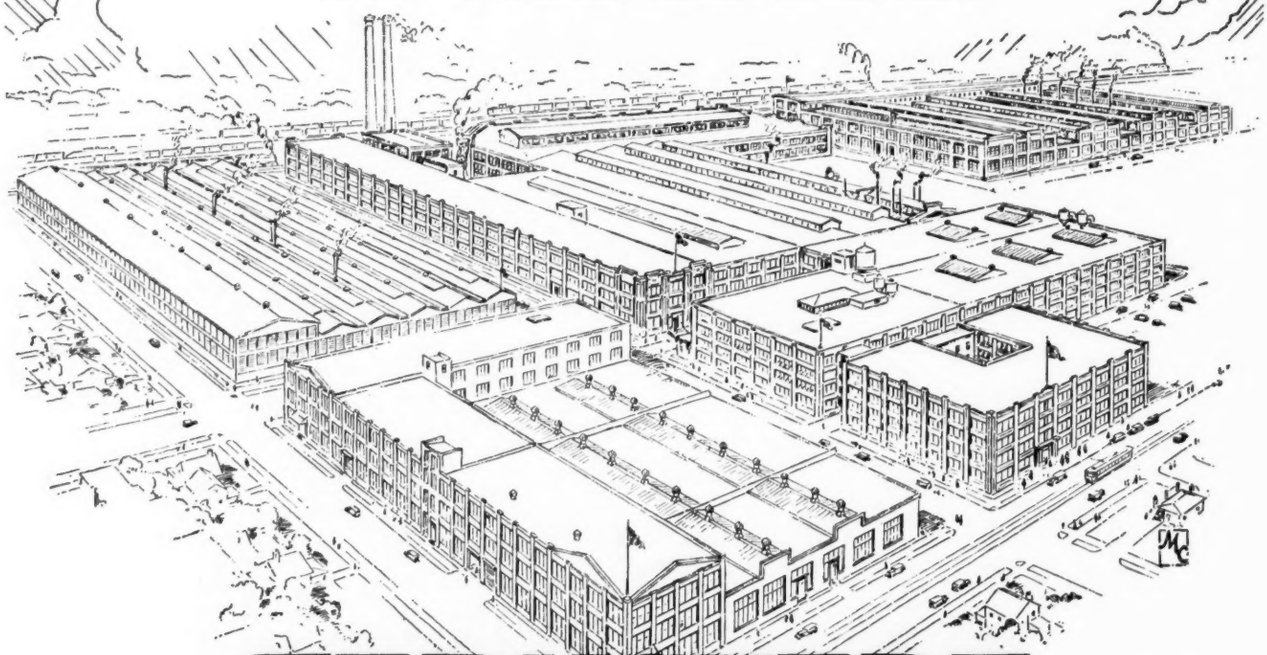

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AUTOMOTIVE INDUSTRIES
VOLUME 56 *Philadelphia, Saturday, February 5, 1927* NUMBER 5

Light Cars, Fuels *and* Employee Training, High Spots of *S. A. E.* Meeting

Mid-winter sessions at Detroit well attended. Broad range of subjects covered. Cobham talks on air travel.

By W. L. Carver

PRONOUNCED interest in the light car question, pleas for better facilities for the training of employees to fill responsible jobs in the industry, and a demand for some standard fuel of known characteristics which would serve as a yardstick for the study of fuels and detonation were the high spots of the annual mid-winter meeting of the Society of Automotive Engineers in Detroit, Jan. 25 to 28.

Although registrations at this year's meeting did not hit record-breaking heights, continuity and intensity of interest were indicated by the high ratio of attendance during the early part of the program. Attendance totaled about 800.

Unusual interest was shown in papers presented by several men who are not within the immediate circle of the American automotive industry. In this class may be included the paper on the English light car by Alan Fenn of the Sunbeam-Talbot-Darracq combine, the production session papers, "The Application of X-Rays to the Automotive Industry" by George L. Clark of Massachusetts Institute of Technology, and "Hardness and Machineability Tests of Grey Iron Castings" by E. J. Lowry of Hickman, Williams & Co.

An innovation at this meeting was a mystery session which turned out to be an impromptu symposium by some of the past presidents of the Society and John H. Hunt, the new president. Although the topic of each speaker's talk was chosen with no collaboration, the meeting was most interesting and unusual due to the wide range of basic subjects which were discussed. Almost every phase of the industry's contact with economic and social life was treated in a broad manner as were many of the problems of the individual engineer in his contact with the industry, new engineering conceptions and finally, with the world of users of automotive transportation.

Four-wheel brakes and tires were missing from the program; the former seem to have become commonplace although the tire question cropped out repeatedly. The fabric body as discussed by H. Steinbrugge of the recently incorporated Weymann American Body Corp. drew intense interest with favorable commentary on many features of its construction, chiefly the light total weight and the practice of attaching the seats to the chassis. Discussion of this type of body elicited considerable comment on the growing use of the all-steel body in this country although no conclusive opinions were drawn.

Chromium Plating a Headliner

Chromium plating as discussed by W. N. Phillips of the General Motors Corp. proved another headliner. The use of chromium plating as a decorative finish for radiator shells and other parts already is well established and its application to mechanical uses is growing rapidly. Another high spot was the talk on body design by the well-known designer, R. H. Dietrich, who predicted that a trend away from the present double belt practice may be expected, although low, sleek appearance will be maintained. Also he pointed toward the use of modified roof construction and the use of "cheat" lines as alternatives.

Two or three sessions were marked by some rather contentious differences of opinion on the relationship of college and university research to the automotive industry. University men feel that they are not receiving enough support, financial and otherwise, from this industry while automotive engineers and execu-

tives reply by stating that research of the usual academic type is altogether too slow and vague for the rapid pace of the industry. The consensus of automotive opinion was that colleges and universities will do the industry more lasting good by devoting their attention to the better training of students in fundamentals combined with a greater appreciation of the needs of business life.

Along similar lines the industry was criticized sharply for its apparent neglect of the training of employees for secondary executive positions. In most plants no opportunity for broadening his scope exists for the employee and he tends to become more or less a piece of human machinery fixed in one position. In addition to being unfair to many employees, this condition works to the ultimate detriment of the industry. Maj. Albert Sobey of the Flint Institute of Technology, which is shortly to be elaborated very largely by the General Motors Corp., compared the industry to a very high building without elevators or stairs to take one to the upper floors.

Sir Alan Cobham, noted British flyer, told of some of his experiences at the airplane travel session

Both Maj. Sobey and H. A. Frommelt explained existing methods for supplying ambitious men within the organization with additional education along specialized lines combined with fundamental work. The school at Flint has proved so valuable that its scope is to be enlarged greatly. From another angle, Prof. M. A. Lee of the College of Engineering, Cornell, outlined the combination of lectures on fundamentals of engineering and business and production administration with a considerable amount of practical application. This paper, presented at one of the production meetings, crystallized comment along the line that engineering students should be given a greater groundwork in basic and applied economics.

The light car session drew an attendance second only to that of the mystery session. The papers by Alan Fenn, and Fabio Sergardi of the Reo Motor Car Co. were given enthusiastic receptions although throughout the discussion stress was laid upon the fact that the English and Continental light cars are creations of imposed legal restrictions. Mr. Fenn averred that if these restrictions were modified or removed, he would expect the displacement to show a decided upward trend. Here again the wide use of the American car by the entire owner family was emphasized as one of the reasons against broad adoption of the European type of light car in this country. While parking at the curb is facilitated, most of the charges for car operation with the exception of those for fuel, tires and tax are not reduced. This condition, combined with the lesser capacity and degree of comfort, is felt to obviate any real need of the light car in this country. As a manufacturing proposition there are some possibilities, but the risk of small demand stands in the way of the large producer.

Detonation was the subject of a very scholarly discussion, although many members feel that this question is somewhat involved. As Thomas Midgley, chairman of the session, stated the case after one paper, "The discussion now is open to anybody who feels that he is competent to discuss this question." From the average engineer's viewpoint, one of the appreciated high spots was Dr. Graham Edgar's statement that one of the great requisites for the solution of detonation problems is a standard fuel, the characteristics of which are known. This fuel then can be used as a basis of comparison and newly developed fuels can be studied in the light of the relation of standard characteristics and performance.

An added novel feature of the meeting was an airplane travel session held after the close of the business session. The meeting drew an unusually large attendance due to the presence of Sir Alan Cobham, the noted long-distance English pilot recently knighted for his flight from London to Australia and return, who told of his experiences on several of his major long-distance flights. Due to the non-technical nature of this session and the intense interest which now centers around all aviation matters, women made up a large portion of the attendance.

Of equal interest were the illustrated talks of Major Lester D. Gardner, publisher of *Aviation*, who flew 21,000 miles last summer over Europe's commercial air lines, and Major Roycroft Walsh, formerly of the U. S. Army Air Service, who was in command of a squadron of U. S. planes which paid a "courtesy trip" to the Central American states last year.

Sir Alan Cobham in his talk showed aerial views of the British airway which now extends from London to India, the route the English planes will soon be following in their flights to South Africa, and interesting scenes of parts of the world never before photographed from a plane. The outstanding feature of Major Gardner's talk was the description of the methods employed for handling passengers and planes at the air terminals in Europe. Major Walsh, who showed aerial pictures of Central America, was able to convey to the audience the remarkable developments which have taken place in the building up of the Central American cities and towns.

Summer Meeting Goes to French Lick Springs

SATISFACTORY progress generally was indicated by the reports which were presented at the brief annual business session held in connection with the S.A.E. meeting. J. H. Hunt, president for 1927, presided.

Membership during the past year increased from 5419 to 5763, a gain of 6 per cent, while the total section membership increased from 2312 to 2651, a gain of 15 per cent. The year also saw 104 national and sectional meetings held, at which 179 papers were presented.

Several suggestions have been made to change the line-up of the officers of the society and it is likely that the membership will have submitted for its consideration three separate plans covering proposed changes.

The treasurer's report revealed the Society to be in an excellent financial condition. Actual income during 1926 totaled $360,638.15, while actual expense was $338,523.26, leaving $22,114.89 unexpended. The assets over liabilities of the Society now total $174,731.15. Anticipating a growth in the Society, the budget for

1927 has been set at $378,400, Treasurer C. B. Whittelsey stated.

At the standards committee meeting of Tuesday morning, all recommendations which have been published recently were passed with three exceptions. Reports on Distributor-rotor Electrode and Ground Return Wiring System were referred back to the committees. Slight modifications were made in the recommendations for Engine-Testing Forms and the New Standard for Signal Lamps. The report on new standards for Tinners, Coopers and Belt Rivets also were referred back to the sectional committee.

Among the more important of the new committee chairmanship appointments of the Society were the following: Constitution committee, H. M. Crane; finance committee, W. L. Batt; house committee, George J. Mead; meetings committee, L. C. Hill; publication committee, E. P. Warner; sections committee, F. F. Chandler; membership committee, F. K. Glynn; production advisory committee, Eugene Bouton; technical advisory committee to A.A.A., T. J. Litle, Jr.; committee on spray coating investigation of National Safety Council, L. Greenberg and L. V. Pulsifer; operation and maintenance advisory committee, R. E. Plimpton; research committee, H. C. Dickinson; riding qualities committee, H. C. Dickinson; highways committee, B. B. Bachman; fuels committee, W. S. James; headlight committee, H. M. Crane. E. T. Jones and Edward Wallace are the new representatives of the Society in the joint Army and Navy Conference on Standardization, while Russell Begg is the Society's representative on the executive board of the A.A.A.

The 1927 summer meeting will go back to French Lick Springs. This was finally decided by the meetings committee during the convention.

That there is a strong probability of the riding qualities test equipment of the Bureau of Standards being transferred to Yale University was one important fact developed at the research committee meeting on Tuesday. An appropriation from Yale for carrying on this work is in sight and the work will be conducted under the direction of Professors Lockwood and Lichty. It was reported that work is to go forward on the headlight testing project at the Bureau of Standards which has been underwritten by the S.A.E. to the extent of $5000. This research will be very definitely from an automotive as distinct from an electrical viewpoint.

Continuance of the cooperative fuel research work was approved, future work to have to do more fully with engine characteristics than in the past. The headlight studies which have been under way for a year past in passenger car factories will be extended to include trucks, buses and other agencies as well.

"*Mystery Session*" Consists of Talks by Six Past Presidents

J. H. Hunt also on program. Subjects range from fuel supplies to flat rates in repair shops. Clarkson in chair.

UNDER the heading of mystery session, all of the past presidents of the society present at this year's meeting and the newly elected president presented a symposium of impromptu talks of their own selection. If any mystery was involved in this session, which was guided by Coker Clarkson, it was the broad range of topics selected by the seven speakers and the absence of any pronounced overlap.

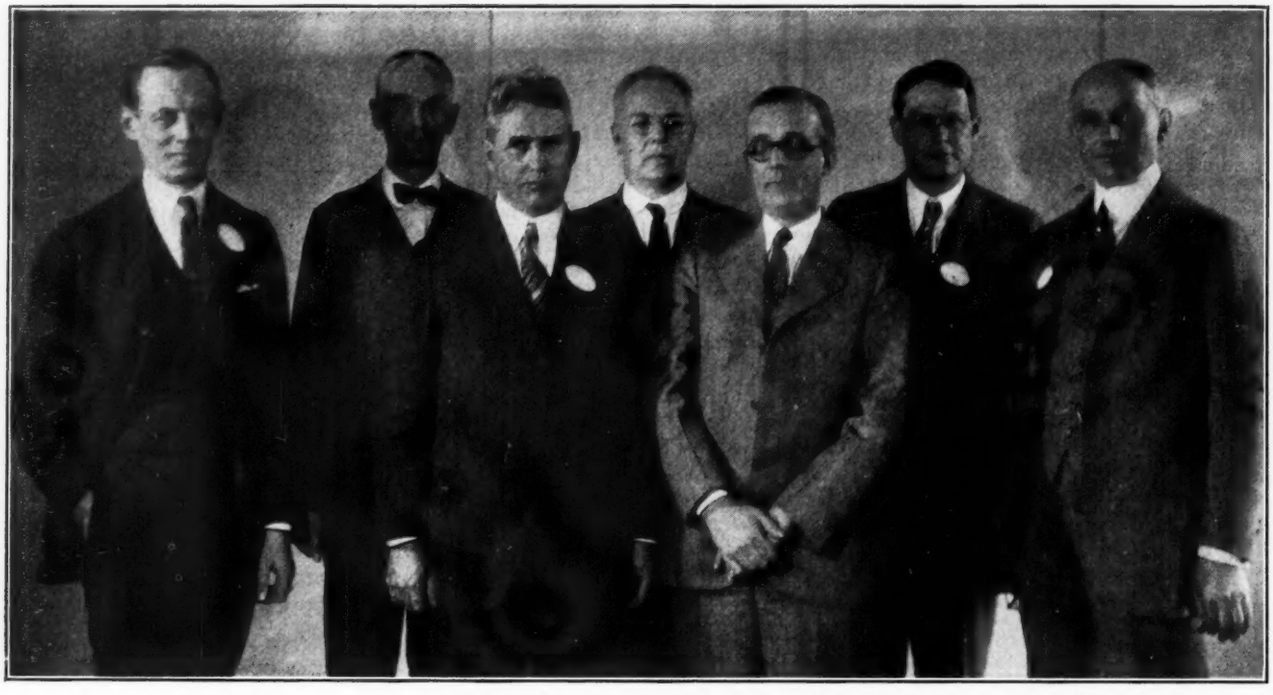
While the keynote of the meeting naturally was automotive, the larger aspects of the industry's place in modern life and progress were treated in several cases. With these were some broad ideas of methods of improvement within the industry. In the order of their appearance the six past presidents who addressed the meeting were Charles F. Kettering, T. J. Litle, Jr., David Beecroft, B. B. Bachman, J. G. Vincent and Henry M. Crane. The seventh speaker was John H. Hunt, president for 1927.

In a characteristic talk in which facts were combined with sallies at a lot of preconceived ideas, Mr. Kettering who, according to his own admission, supplied the acrobatic act while the audience was settling down, spoke of the more recent attempts at fuel conservation and the engineering and economic study which is being devoted to this subject. He pointed to experts' estimates of the present supply being available for eight to 125 years as a sample of the wide difference of opinion which tends to give engineers a bad reputation among financial and business men.

Coker F. Clarkson, general manager of the S.A.E., served as chairman of the mystery session

On a conservative basis, automotive power of today comprises about half of the world's horsepower while internal combustion engines in vehicles develop only about 3 per cent of the power available in the fuel of today. On this basis, the conservation effect of an in-

S-S-S-S-Sh! —*They Spoke at Mystery Session*



LEFT TO RIGHT: *B. B. Bachman, H. M. Crane, David Beecroft, Coker F. Clarkson, T. J. Litle, Jr., J. H. Hunt and J. G. Vincent. C. F. Kettering also took part in the program but was not present when the group was photographed*

crease of thermal efficiency of 35-40 per cent will alone be a tremendous influence. At present about 9,000,000,000 gal. of fuel are used annually by automotive vehicles and this figure bids fair to increase shortly to 10 or 11 billions.

While performance instead of economy seems to be the predominating demand of today, it has been demonstrated pretty well that any improvement which helps economy benefits performance. However, Mr. Kettering does not anticipate that improvements along the economy line will come until the public begins to feel the pinch of high-priced fuel. The non-detonating fuels which are available today, or at least are advertised nationally, are one step along the way to better economy and performance.

Other Potential Fuel Supplies

Over and above the supply of petroleum fuels, a tremendous potential supply exists in shale deposits and only recently processes for the production of liquid fuel through the hydrogenation of coal have been developed in Europe. This process is of particular importance to European countries due to their relative lack of petroleum fuels while coal is deposited widely in Great Britain and the continent.

The survival of the fittest in transportation was the subject of Mr. Litle's talk which was founded on the generally admitted axiom that adequate transportation is one of the foundations of national welfare. He traced the history of the development of transportation methods in this country for the past 100 years, beginning with the prairie schooner which carried most of the earlier settlers of the Western States across the prairie. Then followed the early transcontinental rail system which represented bare transportation without much comfort. The lack of comfort in rail travel turned many people to the steamboat which enjoyed the next turn of popular favor. At this point, the public demand for comfort began to show a marked effect on transportation facilities.

Later followed the electric railway, in many instances paralleling the steam line but drawing patronage due to lower rates and absence of smoke, cinders, etc. Finally with the advent of the automobile, the concrete highway has taken a position of the highest importance in our transportation facilities. Today the motor coach and private passenger car carry more people per year than the railroads. The law of the survival of the fittest is working out in the selection of transportation means and in another phase in the determination of the best type of automotive vehicle for various purposes.

By 1930 the federal system of highways will be so comprehensive that over 90 per cent of the population of this country will be within 10 miles of improved hard highways. The city of Chicago is spending a tremendous sum on the new outer drive, while New Jersey is expending $40,000,000 on a highway 13 miles long. These facts were cited by Mr. Beecroft to show the imperative place which the motor vehicle is taking in the life of today. He indicated that there is some feeling that automotive engineers have not developed a full appreciation of the magnitude of the field which is served.

Repair shops to the number of 83,000 are in existence today. Of these, 44,000 are authorized dealer establishments while 39,000 are independent. In the past year more than 30,000 booklets on the subject of flat rate have been purchased in this field which is an indication of the importance which the maintenance element in car usage and design holds. Accessibility must receive more attention when the car is designed. Otherwise a growing element of sales resistance is bound to

interfere with the full development of the motor vehicle's utility. The flat rate already has become the yardstick of accessibility. Where this rate continues to involve high labor ratios, sales resistance is bound to grow up.

Mr. Beecroft advocates the appointment of standing committees in the S. A. E. for the purpose of continued consideration of the relationship of repair cost and accessibility. He recommends another committee for the consideration of accident causes. Already it has been shown that the peak of the daily accident curve occurs around 5 p.m. and that 40 per cent of accidents occur at street intersections. The appointment of committees to make studies of the Indianapolis 500-mile race and others for the consideration of various factors also was urged.

Bus Progress Reviewed

A review of the progress of bus transportation was the subject chosen by Mr. Bachman. The bus made its first marked appearance on the Pacific coast in about 1919 and most vehicles were rebuilt trucks. Spreading eastward, widespread bus operation was in effect by 1923. Early in that year Mr. Bachman predicted that, with the exception of isolated cases, no severe competition between the new bus and the older forms of transportation would occur. He feels that this prediction has been borne out on the whole and that buses, electric and steam railways are being coordinated into the best combination to meet transportation demands.

No particular form of transportation will entirely meet all needs. In this respect he quoted the remarks of Elisha Lee at the annual meeting of 1924. No new device ever entirely supersedes its predecessors. Mr. Bachman feels that the railroads have accepted the bus and truck as valuable adjuncts to the transportation problem. Some difficulty has been encountered as the result of too liberal financing terms which have caused shortsighted operators to install bus lines where no economic necessity existed or competition was too well entrenched. Bus manufacturers are eliminating this condition by better surveys of transportation demands.

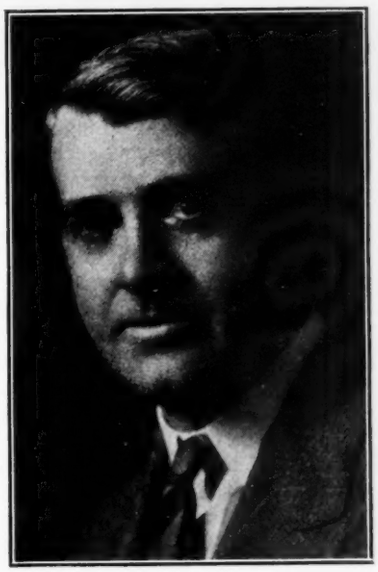
As the result of the increasing utilization of passenger car, truck and bus, a tendency toward decentralization of cities will be natural and in many cases cities will have to be replanned in order to maintain their economic positions.

An entirely different trend of thought was followed by Mr. Vincent in his written paper entitled, "Lecture to the Younger Generation." He concluded that the rising generation requires three traits. First, a spirit of tolerance, because the mere fact that some feature of design has been tried and discarded even years ago does not mean that somebody will not revive it and make it a success. Second, a reasonable conservatism, and thirdly, a stout heart which will stand up under the continued round of automotive progress. This characteristic of progressing in circles has been true of the entire history of the industry and is almost overshadowed by the industry's great capacity to absorb its mistakes.

Early tires were awful affairs but gradually came up to a high standard and apparently everybody was pretty well satisfied when the tire makers unloaded the balloon tire on the car manufacturers and public and the trouble started all over again. We started with battery ignition, then jumped to the magneto and now have reverted to the battery again. From almost no instruments on the dash the swing went to everything that could be loaded into the space and now has gone the opposite way again, although accessory manufacturers have discovered the front of the dash again. Similar experience is characteristic of engine design, both aviation and vehicle, and extends through airplane design. These paths of circular travel force the engineer to realize that nothing in the industry is fixed and what is considered good today may be off the boards tomorrow.

From an entirely different angle but pertaining to the same subject of design and engineering generally, Mr. Crane urged the necessity of greater imagination in engineering work. Imagination according to his definition is the ability to form mental images of things which are new and beyond existing practice. It is this quality which caused Henry Ford to make the automobile a commonplace rather than the toy of the rich or sporting class. Present success and profits of this gigantic industry are traceable to this scource. Imagination distinguishes the real engineer from the copyist who looks backward or sideways.

With a brief interpolation suggesting the thought that the present prosperity and industrial expansion of this country is related to the automobile which has established entirely new standards of living, Mr. Hunt, the new president, discussed five different restrictions upon engineering practice. These restrictions tend to hold back engineering development and hence the achievement of the full economic value of automotive transportation.



Maj. Albert Sobey of the Flint Institute of Technology, who spoke at the training session. He discussed employee training methods in general and those used at Flint in particular

Often engineering advances are held back by production methods which should be discarded. Until recently advance in railroad transportation has been affected seriously by this cause. The automotive industry must guard against reactionary tendencies.

Standards, if too broad and conclusive, restrict engineering progress. Fortunately, the automotive industry has standardized detail rather than basic elements.

Legal restrictions are encountered and can be eliminated only by quiet, intelligent pressure.

Unguided labor regulation attempts to discard an entire process instead of correcting its faults in detail.

Regulation and inspection by extra-legal bodies such as insurance people also tend to deal with means rather than results. These, like legal restrictions, sometimes attempt to anticipate results while knowing little or nothing about means. The existing headlight mess is a typical sample of this condition although the engineer is chargeable with a portion of the blame.

TRAINING SESSION

Professors Assert Industry Doesn't Go After College Men

Automobile factory men reply that in too many cases colleges don't give their students the right kind of training.

By Lewis C. Dibble

THE automotive industry is coming to the realization that one of its greatest problems is to provide for the proper training of men for induction into its extensive and ever-changing personnel. This was brought out in papers presented at the training session, Tuesday afternoon. The meeting was presided over by Louis Ruthenburg.

Adding interest to the session were the charges which were flung at the industry by college professors, deploring the fact that the automobile industry does not take more college graduates into its ranks. As an example of the discussion, Dr. Gilbert A. Young, head of the school of mechanical engineering of Purdue University, declared that of 127 concerns appealing to Purdue for graduates last year, only one was an automobile company. He asserted that in his opinion this ratio was too small and that the industry should make it a point to obtain more college-trained men.

Among those answering the criticisms was N. F. Daugherty of the General Motors Corp., who cited the fact that the corporation, last year, placed more than 100 college graduates and that it is also making provision for 160 pairs or 320 students who are taking cooperative courses at Antioche, Cincinnati University and the Flint Institute of Technology.

"If I were to attempt to summarize in a single sentence the reason for the establishment by the General Motors Corp. of the Flint Institute of Technology, I would say that it represents a movement on the part of this large corporation to make definite provision for the development of the man-power for its world-wide organization," said Major Albert Sobey, director of the institute, in the paper he presented, adding "it represents an effort to meet, in a measure, its pressing personnel problems.

"Every period of change has its own significant trend and its own outstanding problems. This has been true of the period of the American Revolution, and the industrial revolution and in fact all periods of change in history. Without question one of the most significant trends in our present day is the growing recognition of the importance of the human phases of industry and one of our outstanding problems is involved in the development and training of the man-power required for our highly specialized industrial order. This is a problem vitally affecting every phase of industrial operations from the new employee just entering the ranks of industry to the highest executive position.

"My friend, the university professor, probably thought as you may be thinking, that there is nothing new in this matter of man-power development for industry. There always has been the need for development of on-coming youth. This has been recognized as the problem of the school. Also, there always has been the need of the development of men for industrial operations and this has been considered a problem of the shop. And there is a sense in which this is true, for it is a fact that this modern problem does involve the school and is one of the serious problems of school administrators as well as one which is demanding the careful consideration of industrial leaders and executives.

Situation Not So Simple

"The situation, however, is not so simple as my friend thought. Not many years ago, when we here were boys, a high school education would have been to me, for example, the acme of my ambition. There was no doubt in my mind when forced to go to work at the age of 14 that if I could have gone on through high school my future would have been assured. College was almost beyond my fondest dreams. The other day, however, I received a letter from a young man in one of our neighboring states which began with these startling words: 'I am just a poor fool who four years ago graduated from high school and have been trying since that time to find myself and get started somewhere. I have now discovered that something additional, some training of practical value in industry is needed if I am really to get anywhere.'

"About the same time I received from a Buick executive a reprint of an article written for an alumni publication of one of our large universities by a graduate of the institution outlining his futile efforts to find himself after graduating from an engineering course, the article winding up with these words 'and thus my

university has failed me. It taught me idealism when I needed realism. It taught me theory when I needed practice. It drew me in a freshman, it did not advise me and let me learn when it was too late and then turned me out—four years behind the man who did not go.'

"Now do not misunderstand me. I am not criticising our schools and colleges; I owe too much to them myself and feel as you do that they are better organized and doing a better work than a generation ago; but these statements—and they are illustrative of a large number—show clearly the difficulty many of the graduates of our high schools and colleges face as they come out and try to adapt the training they have received to the highly specialized industrial organizations in which they must necessarily find their future. They indicate the problems that our public schools and colleges are facing with reference to this matter of manpower development, the training of young on-coming employees for industrial pursuits, a problem that is clearly recognized by educators in the program of practically every educational convention.

A Real, Vital Problem

"But this is just the school side of the picture," said Major Sobey. "Inside the industries the matter of properly trained employees for various positions requiring skill and ability has become a real, vital problem to the industrial executive for it involves the morale and effectiveness of the entire organization. In this he finds quite a different situation from that presented to his predecessor of a generation ago. When I was a youngster serving a four year apprenticeship in the shop, the master mechanic would frequently put on overalls and spend a half day or even a whole day at a time working with me, stating, in his own words, 'I am going to 'learn' you all there is to know about the business.' A generation ago when I served my time and when other men from the industry here were beginning their careers in the industry, neither executive nor employees looked to schools for preparation for advancement in industry nor for trained men for their organizations. Experience was the thing that counted. Why the change?

"The explanation is found, of course, in the rapid development of the past few decades. From a position of relative insignificance in all the early years of the factory period and before, industry has now advanced to a place of first importance. Greater numbers of people find their place in life within its organizations. Within the industries themselves there has been an even more rapid development in methods and in form of organization. From the so-called good old organization days of the guild period until very recently, industry has had in its apprentice system a means of training its own people for its more highly skilled operations and also has offered opportunity for a general all-around experience to prepare its own people for its own responsible executive and other types of position. This has now been changed. Specialization is the key to modern industry, a specialization carried to such a degree of refinement that eight operations for example, are required, I understand, for the making of just one buttonhole—each employee spending his entire time making one-eighth of a buttonhole. And this specialization applies not only to the production worker. It extends to the executive as well and to practically the entire organization. As a result the apprentice system has been practically wiped out and to a very large extent opportunity for a well-rounded experience and training in the regular processes of industry no longer exist.

"It is because General Motors believes that this is true, that through an organized training program directly related to its industry and supplementing the practical experience gained through its industrial processes, it will be possible to have a more direct means of man-power development, that the corporation has become interested in the educational program that we have in Flint and has given the new campus and building that will provide the facilities required to extend the program to all General Motors units throughout the country."

In describing the courses which will be offered, Major Sobey declared, "The results of the Flint program are before us in definite form. The success of the Buick Authorized Service course has already been indicated. A remarkably large percentage of the graduates are already in responsible positions such as service managers, service salesmen, service foremen, etc., after only three years of operation. The Co-operative Trade Course is contributing to the solution of the problem of skilled craftsmen, and the upper classmen of the Co-operative Engineering Course are in demand throughout the plants."

H. A. Frommelt, who presented an interesting paper on comprehensive apprenticeship program for the automotive industry, also stressed the need of training personnel. "Apprenticeship in the automotive industry," he said, "is not only a possibility but an actuality. The results have proved the necessity of apprenticeship." He questioned the thought which is held by many that the youth of the country are all rushing into white collar jobs. "The most effective argument against this is, as always, a citation of facts. Young American boys are being induced into shops and trades, in localities where apprenticeship has been actually tried, in sufficient numbers for all needs. Even into the foundry, admittedly a department with a disagreeable exterior, it is found possible to attract young Americans to apprentice themselves with the sole thought of learning the foundry trades, molding, coremaking, etc.

"Young Americans can be induced into the trades. They are being inducted into the trades. Wherever the experiment has been tried this is the one outstanding fact that skeptics must first of all admit.

Apprenticeship Necessary

"Apprenticeship is necessary for the life and health of American industry. The economic changes wrought by the World War, the immigration policy upon which, as a country, we have entered, and changes within the industry itself, are forcing us back upon the training on the job 'method to produce the skill without which we will be a bankrupt industrial nation in a personnel sense. All this can be done because it is being done under modern conditions to meet a modern demand.'"

Mr. Frommelt cited the apprentice training which the Yellow Sleeve Valve Engine Works at East Moline, Ill., is conducting. He also told how Studebaker has 82 apprentices in its shops and the program it is following. Reo now has 192 apprentices enrolled and has graduated 254.

"One of the greatest future developments in the automotive field," said Mr. Frommelt, "will take place in the training of personnel. The effect of a comprehensive and adequate program upon the industry as a whole is certainly more than a matter of speculation."

R. E. Plimpton of *Bus Transportation* presented a very interesting written discussion of Mr. Frommelt's paper.

BODY SESSION

Color Expert Explains How to Get Harmonious Combinations

Prof. Munsell's system of scientific selection described by A. S. Allen. Haphazard methods often best, says Towle.

METHODS for determining the proper color schemes for automobiles occupied the major portion of the body session. In spite of the fact that Arthur S. Allen of the Ruxton Color Service, in his paper entitled "Color Harmony," told of scientific methods of blending and balancing colors with particular respect to automobiles, it was brought out that colors for new cars are almost invariably decided upon by executives of the automobile companies who pick out certain color schemes at random from a range of specially painted cars.

Details of Weymann body construction, the future trends of body design and moving pictures of the Hudson body plants were other features of this session.

Mr. Allen pointed to the advantages of Prof. Munsell's system which makes it possible to measure and record colors as the eyes see them. In this system color is defined as being of three dimensions, namely, hue, value and chrome. The relationship of these to one another, together with the method of recording the various shades, were shown by a series of charts and laboratory apparatus. At the present time the Munsell system is used in various branches of the designing, engraving, printing, and poster businesses. Its adaptation to the needs of the automobile industry for more harmonious color blendings was urged by Mr. Allen.

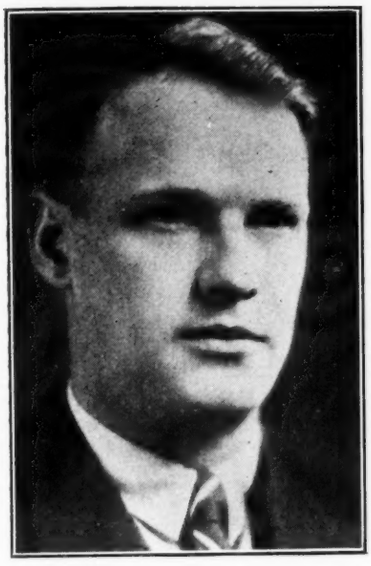
RIGHT: *Arthur S. Allen discussed color harmony in connection with automobile body finishes*

LEFT: *Kingston Forbes, Buick Motor Co., who was chairman of the body session*

One of the most outstanding of Mr. Allen's remarks was that the automobile industry should decrease the number of colors it is using now and should concentrate on fewer colors. It should learn more about the proper combination and balancing of the more important colors and gain the same effects as by using a multitude of different colors. Five simple colors are expressed by the hue dimensions of the Munsell system and these are, red, yellow, green, blue and purple. "By the proper analysis of color dimensions we can do with 20 colors what some automobile companies are doing with 600 colors," Mr. Allen said. In the discussion Capt. H. Ledyard Towle of the duPont company, said that by choosing colors at random for cars we get distinctive color combinations due to possible accidents which are very pleasing to the eye, whereas by a scientific system of determining proper color balance we often do not get distinctive color effects.

Future trends in body design will show cars having a single deep belt molding which will replace the present double belt effect, the elimination of the integral or attached sun visor, simplicity of interiors with the elimination of vanity cases and the like, adjustable front seats, particularly for the driver, and even narrower windshield corner posts, Raymond H. Dietrich, custom body builder, stressed in this paper on "Tomorrow's Trend in Body Design." At several points Mr. Dietrich pointed out the part the chassis engineers could play in providing more comfortable seating and better riding qualities for the cars. Attention to these points would result also in bodies of better appearance, he said.

Poor riding qualities result from using too stiff rear springs for the normal load which is carried by present day automobiles, Mr. Dietrich pointed out. Ninety per cent of the time a car is in use it does not carry the full load for which the springs are designed, as usually three or four people ride in a car, often only



Body design problems were brought into the foreground by R. H. Dietrich

two. The cushion springs are designed for the stiff rear springs and much better riding qualities could be obtained if the cushion springs were made softer. Along this line the driver's seat should be made adjustable because with so many people taking long drives a slight change in the position of the driving seat relieves the operator of fatigue. While it is desirable that the seat should be adjustable for both tall and short drivers it is important that the slant of the back cushions be movable so as to provide a change in driving position. The position of the pedals and the steering column should also receive the attention of engineers, Mr. Dietrich said, as by making these more compact it will allow of better seating arrangements and improved body appearance. The pedals and steering column should be located nearer the engine, he said.

The length of the chassis plays the most important part in body design, Mr. Dietrich continued, and when building bodies on average length chassis the adoption of "cheat lines" which tend to deceive the eye with regards to the length of the body, must be resorted to. He has found the use of deep molding along the bottom sill of the body gives an impression of lowness, while a crown of 5 or 6 in. in the roof with the latter drooping down at the rear and having a full rounded effect, tends to create an air of good proportions. The use of large or deep molding of the single panel variety extending around the entire car gives the car a longer and lower appearance. The size of the window glass also plays an important part in achieving proper proportions.

H. Steinbrugge of the Weymann American Body Corp., in his paper entitled "Recent Developments in the Weymann Body," discussed in detail the manufacture and certain advantages of the flexible type bodies. One of the illustrations thrown upon the screen showed two small hand trucks stacked with small wooden parts. The material on these two trucks was sufficient to build the complete frame for 10 Weymann bodies, which demonstrated the ease with which parts for Weymann bodies could be shipped by the body manufacturer for assembly by the car builder.

Marked interest was evidenced in the showing of motion pictures covering the construction of the Hudson and Essex bodies exhibited by V. P. Rumely of the Hudson Motor Car Co. Of particular interest was the special electric truck which handles a bale of single steel sheets weighing 10 tons without any assistance. In the discussion Mr. Rumely replied in answer to a question that the capacity of the Hudson company body plant was 1000 in nine hours.

DETONATION SYMPOSIUM

Accurate Methods Needed to Gage Knocking Qualities of Fuel

Direct tests better than chemical analysis for determining the degrees of detonation for a given fuel.

UNDOUBTEDLY one of the greatest problems confronting the engineers of the petroleum and automotive industries is the need for an accurate method of measuring and recording the detonation characteristics of fuels. It was brought out in the detonation symposium that direct tests for determining the degrees of detonation for a given fuel were found to be more accurate than chemical analysis methods.

The most widely used method of measuring relative knocking characteristics consists of comparing the actions of one fuel with another by engine test. In this case all mechanical factors are kept constant and the detonation characteristic of various fuels is determined by comparing the components or blends of fuels at which the knocking appears. As knocking with a given fuel may be caused by the functioning of several mechanical variables, knocking characteristics of fuels are also determined by keeping certain mechanical variables constant and varying others. By this is meant, that under certain conditions the detonation characteristics are recorded in terms of load, spark advance, throttle opening and the like at which knocking occurs.

Judging from the number of new pieces of apparatus which have been developed during the past year for

Detonation Symposium Speakers

LEFT TO RIGHT: *W. A. Gruse, Mellon Institute of Industrial Research; H. K. Cummings, Bureau of Standards; George L. Clark, Massachusetts Institute of Technology; S. P. Marley, Mellon Institute*

recording the detonation characteristics of fuels, with particular respect to variable compression ratio engines, and the intense study which is being given to the matter also by the professors of engineering colleges, it is obvious the problem of measuring and duplicating detonation characteristics is one of major importance. There is a definite need for detonation specifications for fuels as no accurate specifications for the knock characteristics of fuels can be determined until some reproducible standard fuel is developed. It is essential in measuring the relative knocking qualities of fuels that the method of comparison be that of comparing the characteristics of two fuels.

Dr. Graham Edgar of the Ethyl Gasoline Corp. in his paper "Detonation Specifications for Automotive Fuels" offered a proposed standard fuel consisting of two pure paraffin hydro-carbons which he states is ideally suited as standard reference fuel. The two hydro-carbons, namely, pure normal heptane and pure octane, are prepared synthetically from tertiary butyl alcohol. By mixing these two hydro-carbons in different proportions it is said to be possible to duplicate the knocking characteristics of any commercial fuel between the limits of 60 per cent of heptane and 40 per cent octane and 40 per cent heptane and 60 per cent octane. As these hydro-carbons are said to be almost identical in chemical composition and volatility they are said to behave alike under all conditions except under detonation.

Specifications for Any Fuel

By using these hydro-carbons it is possible to lay down detonation specifications for various fuels. It is necessary in making the specifications for the knocking characteristics of fuels for a given purpose to specify that the characteristics of the fuel to be tested shall be equal to some definite mixture of the two hydro-carbons in question.

Dr. George L. Clark of the Massachusetts Institute of Technology in his address, "The Study of Detonation and Detonation Control by the Ultraviolet Spectroscopy of the Flames of Motor Fuels," opens up new lines of determining the characteristics of detonation.

The results of spectroscopic experiments, in which a carefully controlled single-cylinder Delco engine with a quartz window and an ultraviolet spectroscope (which analyzes the radiation emitted during explosion) were used, are briefly presented and considered in the light of theories of detonation and of the action of knock suppressors and inducers. Outstanding observations are as follows:

(1) The spectrum extends much farther into the ultraviolet for detonation than for normal combustion or explosion for a given fuel.
(2) Knock suppressors, independent of the type of compound (lead tetraethyl, analine, etc.), absorb the ultraviolet radiation.
(3) Various fuels produce strongly banded or practically continuous spectra.
(4) The spectra for the first and second quarters of a stroke during detonation are very intense and extended, while for the third and fourth quarters scarcely any radiation energy is detected; with knock suppressors the spectra for all four quarters become much more nearly alike.
(5) The spectral lines for metal in fuels containing lead tetraethyl, appear only in the first quarter of the engine stroke.
(6) Spectroscopic data are correlated with other data (knock, composition, etc.), for a number of commercial gasolines.

Data were obtained during all runs in which the spectra of the reaction in the motor have been photographed, in order to assure constant conditions and in order to assist in the interpretation and comparison of the ultraviolet spectra. These were photographed through the quartz window mounted in the side of the cylinder of the motor.

That petroleum gasolines of satisfactory anti-knock value are available and that the detonating tendency of gasolines is best determined by direct engine test were the outstanding conclusions drawn from the paper prepared by Samuel P. Marley, Donald P. Stevens and W. A. Gruse, entitled "Petroleum Motor Fuels—Their Detonation Characteristics." The authors are of the Mellon Institute of Industrial Research, University of Pittsburgh. The paper was read by Mr. Marley.

In the paper it was brought out that tests have been conducted recently on the examination of 18 petroleum gasolines for detonating qualities by both direct engine tests and chemical analysis. A single-cylinder Delco lighting plant engine, suitably modified, and a direct reading detonation indicator were employed for the tests. The chemical analyses were made by the method of Morrell and Egloff. This consists of determining the proportions of paraffins, naphthenes, unsaturated and aromatic hydro-carbons, and calculat-

ing the aromatic equivalence of the hydro-carbons so found by the use of data of Ricardo on the relative knock-reducing tendency of unsaturated hydrocarbons, napthenes and aromatic hydro-carbons. These data indicate an equivalence expressed by the ratio 5:4:1.

Experiments were made in which a constant proportion of one hydro-carbon of each class was added to a gasoline, and the detonating tendency of the resulting mixture determined by engine test. Use of two gasolines as base fuels and a system of inter-comparisons gave results indicating, for the particular experimental conditions and for the hydrocarbons used, an equivalence indicated by the ratio 2:2:1. The examination by engine test involved comparing each gasoline with mixtures of a standard gasoline and benzene or kerosene. The mixture equivalent to each gasoline gave the so-called benzol equivalent. The equivalent was determined for each gasoline against two standard fuels, one a straight run mid-continent gasoline and the other a good average motor gasoline. It is pointed out that the degree of correlation between results by engine test and results by chemical analysis will vary with the quality of the standard fuel employed. In general, the benzol equivalents calculated from chemical analysis did not agree satisfactorily with those found by engine test.

H. K. Cummings, Bureau of Standards, in his paper on "Methods of Measuring the Anti-Knock Value of Fuels," dealt with the methods employed by 10 different investigators working on the detonation problems. Nearly all these methods consist of engine tests, or rely on engine tests for their interpretation and most of them involve a standard of knock intensity. Instruments for estimating knock intensity include:

(a) The ear (sound intensity).
(b) Optical indicators (shape of pressure time curve).
(c) The Midgley bouncing pin apparatus (cc gas evolved/minute).
(d) A galvanometer (electrical conductivity).
(e) The diaphragm indicator (time to shear a given diaphragm).

In a few instances fuels are rated according to the intensity of knock which they produce under like operating conditions in a given engine. In most cases, however, some engine condition is altered to give the same intensity of knock with different fuels. In the variable compression engines the compression ratio is varied to obtain the highest useful compression ratio for each fuel while in other methods of test the compression pressure is altered by supercharging a low-compression engine or throttling a high-compression engine to obtain the maximum mean effective pressure for each fuel.

PRODUCTION SESSION

X-Ray Cited as Best Instrument for Studying Materials

Use of X-rays in automobile industry treated in paper read by G. L. Clark. Chromium plating progress outlined.

ALTHOUGH widely unrelated topics were presented in the four papers of the production session, each attracted lively interest and the discussion in each case was terminated only by the time limitations of the program. Perhaps the outstanding feature of these sessions was the presentation of X-rays as the final agent in the inspection and investigation of the entire range of automotive materials. Practically equal interest was drawn by another paper which upset most of the preconceived opinions about cast iron.

Chromium plating is one of the "red hot" topics of the industry if the interest and multiplicity of questions following a paper on this subject is any guide. Then came a paper on the question of what engineering students shall be taught to fit them for industrial executive positions.

X-rays are not to be regarded as a potential instrument for the inspection of current production in the line but as the ultimate agent for establishing practice. X-rays go to the very foundation of the structure and character of material and by means of difraction photographs present evidence which is obtained readily and, as it deals with the individual molecule, cannot be controverted. Among automotive materials which already have been subjected to X-ray research in the form of difraction photographs are iron, high speed steel, rubber, shellac, asbestos, lubricating oil, rolled and drawn steel and cellulose. Radiography of castings for the detection of internal flaws also was featured in the paper, "The Application of X-Rays in the Automotive Industry," presented by George L. Clark and prepared in collaboration with R. H. Aborn and E. W. Brugmann of the Massachusetts Institute

of Technology. A digest of the paper follows:

X-rays are electromagnetic vibrations, in every way similar to ordinary visible light except that the average wave length is only about 1/6000 as great as yellow light. In the electromagnetic spectrum are to be found, therefore, several types of radiation, all of which are fundamentally alike except in wave length. The range in Angstrom units (1. A.U. = 0.0000001 cm.) are as follows:

Milliken Cosmic Rays	0.0004 to 0.00067
X-rays (from radioactive elements)	0.01 to 1.4
Ultraviolet rays	136 to 3900
X-rays	0.06 to 1019
Visible rays	3900 to 7700
Infrared rays	7700 to 4×10^{9}
Solar radiation (reaching earth)	2960 to 53000
Hertzian (radio) waves	1×10^{6} to 3×10^{14}
Electric waves	3×10^{14} to 35×10^{16}

The use of radiographic examination of metal castings is aimed at two general results. One of these is the development of a casting technique which will insure the production of as large a percentage of castings free from serious defects as is possible. The other is the determination of the internal soundness of the one particular casting under examination. In the development of foundry technique, castings made in a certain way are examined, the typical defects discovered, the technique then changed to eliminate such defects, typical castings made by the new technique examined, other changes in technique made if necessary, and so on.

Defects usually revealed by radiographic examination are gas cavities, sand inclusions, slag inclusions, pipe cavities, porosity, cracks, metal segregations.

The greatest single field for the application of research, testing and manufacturing control methods in the automotive industry by means of X-rays is unquestionably that of metals: (1) The examination of the gross structure for defects (radiography); (2) the determination of the fundamental lattice structures and atomic arrangements of the crystals of which all metals and alloys are constituted; and (3) the detection and estimation of the effects of mechanical and heat treatment, grain size and other attributes.

X-RAY diffraction photographs can be made from the original piece if desired, although the length of exposure varies somewhat with the thickness of the part. Also good results are obtained by photographing rays reflected from the surface of the material.

As an automotive material cast iron has acquired a bad reputation more from the various notions which have been handed down from generation to generation in the foundry than from any inherent fault in the metal. Composition of cast iron is rather complex and too often investigators start out to prove that one element or factor is the controlling element of hardness, machineability and wear with the underlying idea of vindicating some foregone conclusion. Really up-to-date foundry methods which are free from this bias are producing cast iron of as high as 75,000 lb. tensile strength. These were some of the outstanding features of the paper on cast iron relative particularly to the automotive industry, which was presented by E. J. Lowry of Hickman, Williams & Co.

E. J. Lowry of Hickman, Williams & Co., Who discussed grey iron castings

In the course of his paper almost all of the preconceived ideas of the determining elements of quality castings were upset. Alloys such as chrome, nickel, etc., have a very definite high value in producing castings of superior grade but their potentialities have not been utilized to the best advantage. Very often these alloys have been used more or less blindly as panaceas to correct troubles arising from a misconception of the metal's characteristics or faulty foundry practice. Some of the fallacies which exist today were pointed out as follows:

Great Brinell hardness is not always a sign of wear resistance. Many tests have demonstrated that with the correct iron, great resistance to wear can be obtained with an open-grained iron of relatively low Brinell reading.

Similarly, machineability does not range inversely to hardness and in many tests castings of around Brinell 200 machined with less power consumption and tool wear than castings showing 125 Brinell.

The theory that hardness goes hand in hand with the combined carbon content does not hold water when practice in many plants is checked.

In addition to discussion of the chromium plating of Olds radiator shells, which has been described in detail in an earlier issue of *Automotive Industries*, W. N. Phillips of the General Motors Corp., also devoted considerable attention to the application of chromium to various mechanical parts and gages and tools in his paper. For decorative work, Mr. Phillips prefers the use of a copper and nickel coat under the chromium which is less than .0001 in. thick. The cost on this basis is about one cent per sq. ft.

Chromium plate over a steel base for decorative parts is more durable in many parts of the country than is all nickel and eliminates the tarnish problem. Zinc base die cast parts such as door handles, etc., are plated very satisfactorily when a nickel striking coat is placed under the chromium.

For hardness in mechanical service, chromium plat-

A talk of chromium plating was given by W. N. Phillips of the General Motors Corp.

ing now is used very generally throughout the General Motors plant. Plug and snap gages, thread gages, burnishing tools, broaches and similar parts are plated with great success. Chromium plating is particularly advantageous on burnishing tools due to the low co-efficient of friction between chromium and practically all other metals.

The outstanding feature of this practice of chromium plating tools and instruments is the conservation of material. When the gage wears slightly, it is deplated and then replated to the correct size or is plated to an oversize dimension and lapped to the desired size. Also, chromium plating eliminates the necessity for the use of tool steel for gages, jig bushings, etc. In some cases plate .015 in. thick has been produced for tool and instrument work.

One General Motors unit already is chromium plating piston pins.

In the concluding paper of the production sessions, a phase of the development of future business executives was discussed by Prof. M. A. Lee of the College of Engineering, Cornell University, in his paper, "Teaching Production Principles." The purpose of this course is to short cut some of the things which have to be pounded into the college graduate by bitter experience. While fundamentals of not only engineering but industrial management are taught, much of their value is crystallized by confronting the student with various forms of typical practical application. Where students are handled in rather large bodies, these fundamentals are explained in lectures and their application is developed by detailed work.

The present class at Cornell is attacking the problem of the production of an automotive gear case from every angle from plant construction and layout to cost keeping, routing materials, etc. Student practice is based on the detailed drawings and operation sheets supplied by the Brown-Lipe Chapin Co. Complete plant organization and operating methods are projected and time study and cost accounting, budget systems, material routing, etc., are studied in detail. Finally, the student makes an analysis of his financial structure, overhead and similar items.

John Younger, chairman of this meeting, added that trade papers are an important factor in his course at Ohio State University, as in addtiion to providing the student with the knowledge of fundamentals it is important that he should be fully aware of the current developments occurring in industrial practice during the period of his college work. Heretofore colleges have overlooked this angle and the student graduates were confronted with the big problem of filling up this four or more years' gap in a field which is making tremendous strides. During the discussion emphasis was placed on the desirability of teaching engineering students more basic and applied economics.

RESEARCH SESSION

University Research Held of Little Value to Automotive Industry

Factories forced to depend on their own facilities for such work because of the importance of the time element.

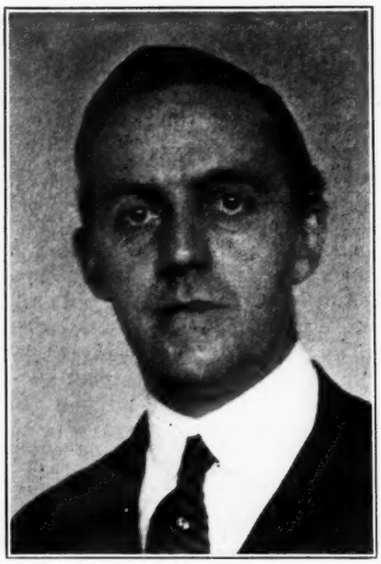
LIVELY discussions between certain leading engineers of the automotive industry and professors from engineering colleges followed the reading of the "Tendencies in Research at Engineering Colleges" paper during the middle of the research session. Several of the professors attending the session took the opportunity to state that the automotive industry is not playing its part like the other industries in helping to contribute toward the advancement of engineering colleges. While the discourse on college training occupied a large portion of this session three papers relating to fuels, engine starting, and detonation were presented and discussed also.

Dr. Gilbert A. Young of Purdue University, who read the paper on research at engineering colleges, mentioned that during the past eight years the university has spent over $150,000 on automotive research. The automobile companies have not contributed anything toward this work. Over $500,000 has been received by 15 engineering colleges during 1924-25 from other industries through cooperative relations. By way of contrast Dr. Young stated that the American Railway Association has appropriated over $500,000 for extensive studies and cooperative relations with Purdue University.

Taking sides with the professors, F. F. Chandler, chief engineer of the Ross Gear & Tool Co., assailed the attitude of the automotive engineers who state the research work conducted by the universities isn't of any value to the industry. Their reason for taking

this attitude is because they have grown beyond the stage of appreciating the work that is being done by the colleges, he said. Furthermore, he defied any engineer to prove that the work done by the colleges is not of value to the industry. During the next 10 years, he continued, the country will draw over 2,000,000 men from the engineering colleges and many of these will be needed for research work.

One of the reasons why the automobile companies do not contribute much toward the engineering colleges, J. H. Hunt of the Chevrolet Motor Co. stated, was because the automobile companies compete among themselves for research supremacy and that the time element in automotive research is one of utmost importance. Mr. Hunt characterized some of the research done by the colleges for other industries as being along the line of investigating and testing inventions and novelties for industries which do not compete among themselves and where the time element is not important. Colleges could employ their research departments to determine problems which the automotive industry can not do, Mr. Hunt suggested.



Stanwood W. Sparrow, one of the speakers at the research session

G. A. Young spoke on tendencies in research at engineering schools

Henry M. Crane of General Motors Corp., stated that the present line of approach of the engineering colleges to the automobile companies was wrong. They cannot hope to solve the problems of the automobile industry, as the factories are forced to do this themselves because of the time element and because the factories are equipped with more suitable apparatus for making investigations. Their proper method of approach, which will result in the colleges receiving money from the industry, he said, was to train men whom they can offer to the industry to solve the problems of research.

It was generally intimated by the engineers taking part in this discussion that the university should not endeavor to push actual research work for the automobile industry but should develop men for research work and teach them the fundamentals of science. The functioning of the research departments of the colleges should be to determine where the student can be fitted in best for research work.

R. E. Wilson took part in the discussion of causes and effects of detonation

In summarizing his paper, Dr. Young stated that the automobile industry has a clear-cut obligation to provide engineering colleges with special equipment and funds for the solution of new problems through research in order to be certain that automotive engineers of the future will have as good a background of knowledge as that possessed by the present generation. More liberal support for engineering reasearch at colleges and universities will improve the quality of engineering college graduates.

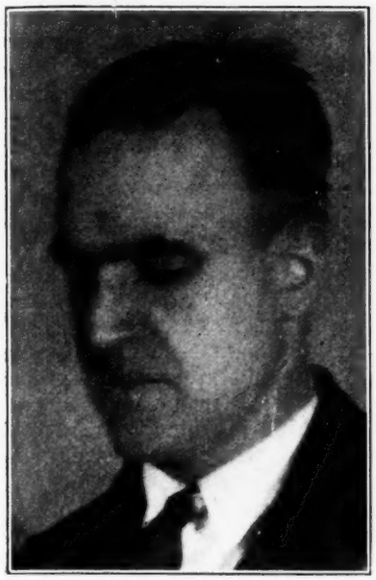
With the results of the four tests covering the cooperative fuel research project reported to the research department of the S.A.E., the conclusions drawn from these tests were made known in the paper on "The Cooperative Fuel-Research to Date," presented by H. C. Dickinson of the Bureau of Standards.

These tests were divided into two distinct projects, each covering both a winter and summer schedule. One of these was run by the Bureau of Standards under road conditions and the other by 10 individual companies involving about 150 cars which were driven by their owners in ordinary service. The following six conclusions were reached when the details of these four independent tests had been gathered.

1. Within the range covered by the test fuels the number of ton miles per gallon is independent of the fuel volatility. Therefore, the heaviest fuel is deemed the most economical.
2. Gasoline consumption is somewhat greater in winter than in summer.
3. Dilution of crankcase oil is consistently greater with the heavier or less volatile fuel.
4. Dilution of crankcase oil is much greater in cold weather than in warm.
5. Small differences in the initial volatility of the fuel have a large effect on engine starting.
6. Starting performance of the fuel is the quality most readily noted by the driver.

From this survey it was concluded that economy dictates the use of as heavy a fuel as possible but that a practical limit in this direction is set by the dilution of crankcase oil and the difficulty of starting.

In his paper entitled "Fuel Requirements for Engine Starting," John O. Eisinger of the Bureau of Standards defined the required factors necessary for obtaining best starting conditions with a given fuel. These are as follows: 1, Possible starting with a 1 to 1 mixture supplied at lowest temperatures ever anticipated; 2, starting in 10 engine revolutions with a 2 to 1 air-fuel mixture supplied at the average minimum



Progress report on starting and acceleration tests was made by J. O. Eisinger

temperature encountered in service. The definitions serve to fix the percentage of the fuel which must be evaporated at each of the temperatures in equilibrium air distillations, namely, 5 per cent in a 1 to 1 mixture and 15 per cent in a 2 to 1 air-fuel mixture supplied.

It was shown that the ratios of the absolute temperatures corresponding to a 5 per cent evaporated in A. S. T. M. distillations and in equilibrium air distillations are practically constant for the nine fuels employed in the investigation. The lowest temperatures ever recorded and the average minimum temperature for any season and any locality are fairly well known from U. S. Weather Bureau statistics. This information and the data given in Mr. Eisinger's paper furnish a ready means for specifying the fuel to meet starting requirements in any locality.

Future Work is Sketched

Future work necessary to overcome the disadvantages of detonation were mentioned in the paper on "Causes and Effects of Detonation" read by Thomas Midgley, Jr. The four major points which need attention in the elimination of detonation are:

1. A standardized method of measuring detonation.
2. Modification of present day internal combustion engine design.
3. Modification of fuel compositions.
4. Fundamental research of detonation.

Some of the effects of detonation, Mr. Midgley pointed out, are broken spark plug porcelains, rupture of piston heads, failure of bearings and roughness of engine operation.

LIGHT CAR SESSION

No Future Seen Here for European Type of Small Car

Consensus of American engineers is that public wants plenty of power and room. Fenn tells of British practice.

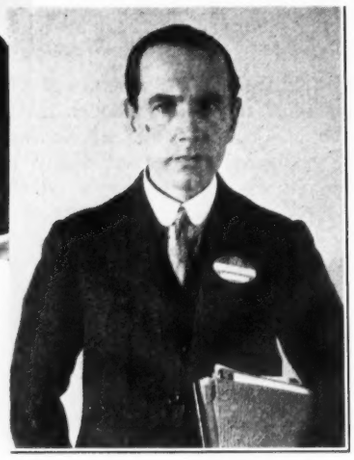
By Leslie S. Gillette

IT was the consensus at the light car session that the small type of automobile in the European sense will not meet with any degree of popularity in this country. When referring to the European type of small car it is understood to be a car having a high-speed engine of approximately 91 cu. in. piston displacement, short wheelbase, narrow tread, and relatively small-sized bodies.

In Europe, and particularly England, the small car is a matter of necessity rather than choice, influenced chiefly by four important factors, namely, high taxation, comparatively low purchase price, high cost of fuel, and the type of roads, the latter being of the kind which makes the operation of small cars more desirable.

Members of the S.A.E. had a very unusual opportunity of learning the British angle of the light-car situation from a paper delivered by Alan R. Fenn entitled "The English Light Car and Why." Mr. Fenn, who is a designer of English cars and connected with the Sunbeam-Talbot-Darracq combine, England, came to the United States especially to deliver his paper before the annual meeting of the S.A.E. Mr. Fenn stressed the point that one of the reasons for the light car in England was that the populace always has been accustomed to small cars from the beginning. In the discussion following, Mr. Fenn admitted that if the high taxation were removed from cars there would doubtlessly be larger cars built. He stated the British factories have been forced to build slightly larger cars for the overseas markets than those offered to the domestic trade.

Below: Alan Fenn, of England, who discussed the light car from the point of view of the British manufacturer



Above: Fabio Sergardi, Reo Motor Car Co., told of his experience in light car design

After the cyclecar era in England in 1911 genuine small cars began to make their appearance. Due to the low price at which these machines could be sold, the low taxation costs, and the fact that the automobile clubs through sporting contests had demonstrated the practicability of small cars, these machines immediately "caught-on." Up until the outbreak of the war the small car was characterized chiefly by a two or four-cylinder engine of 61 cu. in. displacement, weighing about 1000 lb. and carrying as a rule only two passengers. After the war the lack of spending money and the high taxes caused the designers to exploit the small-size, high-speed engines. Much was learned about high efficiency engines from aircraft powerplants and the lessons were applied to automobile engine design.

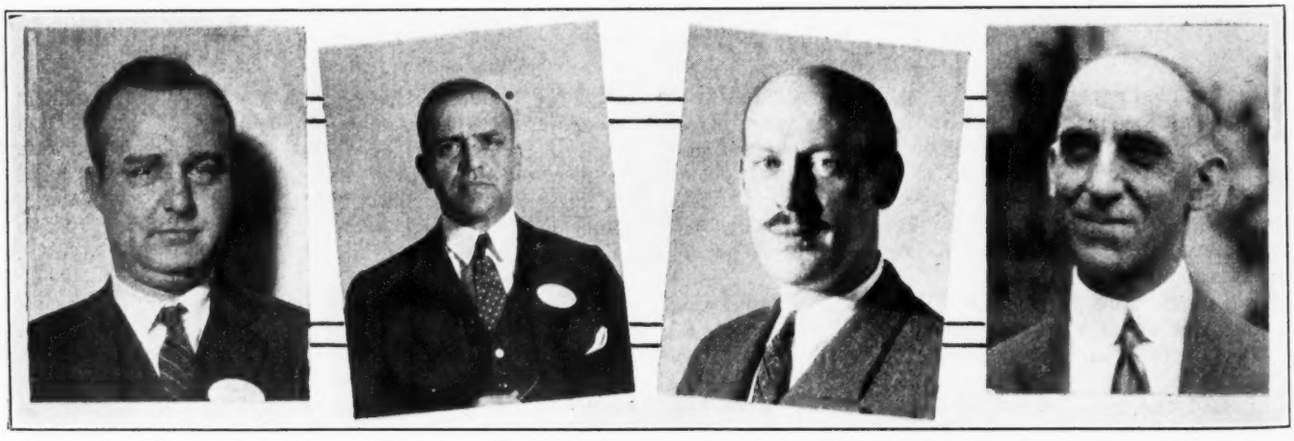
From this time the cars became roomier and heavier, although the designers were able to keep up with the demands in this respect without increasing the volumetric capacity of the engine much beyond 70 cu. in. and without sacrificing road performance. Higher compression ratios, heavier crankshafts and lighter reciprocating parts contributed much toward the development of the engines. Today, the small car is not restricted to the low-priced field. Cars of this type and known as "sports models" are now being sold at prices as high as $5000 with the lowest priced cars of this type listing around $700.

There has been a marked tendency recently, Mr. Fenn continued, toward selling English cars fully equipped as the result of the American practice, which makes a strong appeal to the British public. Bumpers are now becoming popular on English cars while closed bodies are beginning to dominate, especially for family types of car. Mr. Fenn stated that another reason for the small car coming into vogue was a certain amount of "bite" which is found only in the engines of certain small cars. He characterized the average American engine as being "fluffy."

Fabio Sergardi, engineer for the Reo Motor Car Co. and an authority on small car design, in presenting the other paper of the session entitled "How Small Should a Small Car Be?" stated the only attraction an European type of small car could offer to the American public would be one of low cost. To attract buyers the new small car must sell for about $150 less than the present lowest-priced car, which means it would list around $380. In order to be able to build a car to sell at this price it would have to be very much smaller than those on the market now and it would at the same time have to be a full capacity car. Also, it would have to look and be as well finished as the present low-priced cars we have. This, Mr. Sergardi says, is practically impossible unless enormous production plans are relied upon.

Frequent reference was made by Mr. Sergardi to a batch of six light cars he built recently for one of our big organizations. For policy reasons of the company this car never was put into production. He stated the car was of the two-passenger type with the open model weighing 750 lb. and the closed cars weighing 1000 lb. The four-cylinder engine gave 13 hp., the wheelbase was 76 in. and the tread 46 in. In his opinion there was a big market for this type of car but the problem lay in getting the costs down so that it would undersell the present low-priced models.

Session Chairmen



Left to right: Thomas Midgley, detonation symposium; Louis Ruthenburg, training session; H. E. Maynard, chassis session; Dr. H. C. Dickinson, research session

TRANSMISSION SESSION

Believe Many Cars of Future Will Have 4-Speed Transmissions

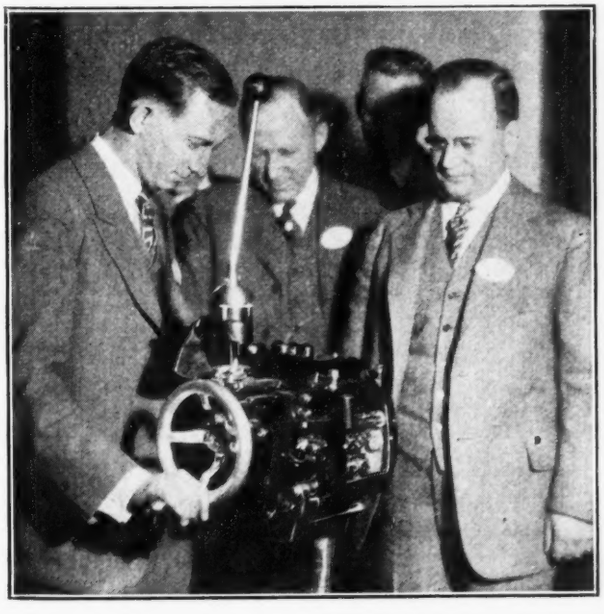
Already in use by Paige and Durant. Mechanical and operating features described. Paper on Constantinesco device.

RECENT strides in the development of four-speed transmissions which have two "high-gear" speeds, will result in these units coming into general vogue in the near future. This was the opinion voiced at the transmission session following the reading of the paper, "Four-Speed Internal Underdrive Transmissions," by Harold Nutt of Durant Motors, Inc. It was said that some of the transmission companies are in production on units of this type and it is expected several cars will adopt them very shortly. At the present time the new Paige Eight is equipped with a four-speed underdrive transmission while over 1000 units of similar design have been fitted into Durant-built vehicles.

In view of the interest now being evidenced in transmission design, the complete description and working principle of the Constantinesco torque converter, which is causing considerable comment both in England and here, proved to be a very timely subject covered by the other paper read at this session. While the principle and operation of the torque converter may seem somewhat complicated, R. K. Jack who read the paper, entitled "The Constantinesco Torque Converter," was able to make the details very clear by means of a lever with a heavy ball at one end, and also with a number of diagrams. The technical description of Mr. Constantinesco's device appeared in the Jan. 22 issue of *Automotive Industries.*

One of the most important factors contributing to the success of the four-speed underdrive is the adoption of internal gear drive for the third speed and a direct drive in fourth. It is said that with the new transmission it is difficult to detect whether the third or fourth gears are engaged, so effective is the internal gear form of drive in achieving silence.

The advantages of the four-speed transmission were treated at length by Mr. Nutt. Road tests showed that a saving in fuel of approximately 20 per cent can be expected, the speed of the engine can be decreased from 20 to 30 per cent with the consequent reduction of noise and vibration, hill climbing ability is materially improved as the shift to "third" when necessary can be made easily and noiselessly at any speed, and the size of the drive pinion of the rear axle can be increased



Left: The Durant four-speed transmission which was exhibited and discussed at the transmission session

Right: R. K. Jack, whose paper on the Constantinesco torque converter was a feature of the transmission session

through the use of a larger pinion as a lower rear axle ratio is employed.

The unit described by Mr. Nutt is of the usual three-speed gear-set design. At the forward end of the transmission is a cylindrical housing having an arrangement of internal gears which provides the third speed with a ratio of 1.4 to 1. For third speed the drive is from the 17-tooth gear at the front end of the main shaft to a 21-tooth internal gear on the inside of a sleeve surrounding the main shaft. On the opposite end of this sleeve on its outer surface is a 31-tooth gear which engages with a 35-tooth internal gear carried in a cup-shaped forging which is supported in the center section of the transmission case by large roller bearings. The sleeve gear is mounted on a pair of roller bearings which are eccentrically located with reference to the cup gear, the amount of offset being determined by the tooth difference and the pitch of the mating internals. A pair of roller bearings inside the cup gear serve to hold it square with the main shaft axis and at the same time provide the back bearing for the main shaft. The forward end is conventionally mounted on an annular ball bearing.

A hollow metal clutch engages with the teeth on the end of the cup gear and transmits the motion to the back section of the main shaft which carries a first and second gear cluster, as well as the teeth on which the clutch slides. For direct drive the clutch is moved to the rear through a neutral position to the point where its teeth engage with teeth cut on the back end of the main driveshaft. The countershaft has the conventional constant mesh gear layout, but instead of being keyed to the shaft the low and second speed gears are cut on a sleeve which is a sliding fit on splines, and this sleeve is moved either forward or to the rear to make the low and second speed shifts respectively.

Perry L. Tenney, of the Muncie Products Corp., outlined a set of ratios which he believed would be ideal for use with four-speed transmissions. A ratio of 4 to 1 in fourth speed, a total ratio of 5½ to 1 in third, a 9 to 1 in second and a 15¼ to 1 in low or first speed, would give better performance in second speed than found on conventional three-speed cars, a much better performance in third or fourth speed than encountered in third-speed of the usual type transmission, with the low speed approximately the same for both types. Four-speed transmissions will not increase the top speed more than 3 to 4 m.p.h., Mr. Tenney said.

Commenting on the Constantinesco torque converter, one of the members stated he discovered that a patent had been registered in the United States on a device having the same general principle of operation as that employed by the device of Constantinesco.

CHASSIS SESSION

Wheel *Shimmy* is Blamed on Tires but Tire Men Say *No*

K. L. Hermann's paper on "Causes of Wheel Shimmy" leads to controversy. Skidding analyzed from new angle.

USUALLY when the question of shimmy is the subject of an S.A.E. meeting, a violent divergence of opinion and, in the end, a deadlock, are expected. The concluding session of the three-day meeting lived up to specifications completely. In the chassis session, the shimmy question broke out with the conclusion of K. L. Herrmann's paper, "Causes of Wheel Shimmy," which in the last analysis tended to throw the burden of shimmy troubles on tires and tire manufacturers. This brought an immediate reply from Burgess Darrow of the Goodyear Tire & Rubber Co. His denial of the tire's sole responsibility was sweeping and general and also specific with regard to the six major points of Mr. Herrmann's paper.

Additional discussion was somewhat in the direction of supporting the tire faction in this case as it was cited that shimmy existed long before the advent of the balloon tire and that many cars equipped with balloon tires do not shimmy.

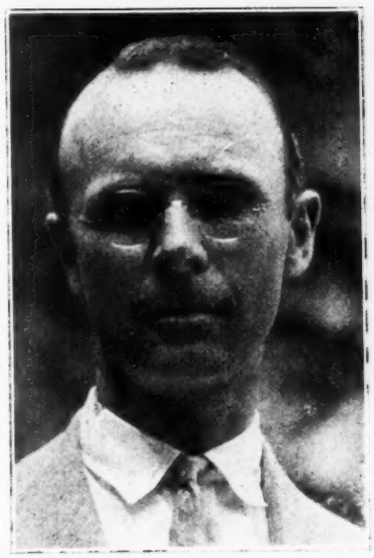
In addition to this controversial subject, considerable interest was attracted to the study of pivoting and spinning by Johannes Plum of the Royal Danish Legation in his paper, "Why Does a Car Pivot." After tracing the manner in which the skid, as analyzed in the terms of his paper, is developed, Mr. Plum concluded that in the end it is necessary to design a four-wheel brake system which combines two different methods of braking, for wet and dry weather respectively.

In the third paper of the session, Walter C. Keys of the United States Rubber Co. described the latest rubber spring-anchorage device developed by that company and known as the U. S. Rubber Spring Mount. This is an assembly which is built around a rubber core. The

exterior portion of the spring mount is an endless fabric and rubber ring. Bolts for attachment to frame and springs pass through opposite sides of this ring but are insulated from each other by the central rubber core. Stresses are distributed throughout the device by formed steel washers under the bolt heads within the core. Several different types have been built and are in road test now, variations being made to accord with the action at the free and anchored ends of the springs.

After tracing effects of caster, camber and toe-in on shimmy, as based on the results of a long series of tests, Mr. Herrmann also dealt with the effects of wheel assembly balance, air pressure, radial run-out, side run-out and uniformity of tread thickness. Finally he arrived at the conclusion that the tire is the major offender as regards shimmy and that much of this fault lies with the rubber companies. In refutation of the evils charged to the rubber companies, Mr. Darrow issued a blanket invitation to automotive engineers to visit his laboratories and compare apparatus and equipment with that of the other industry in light of the essentially different nature of the two products. Mr. Darrow also emphasized the elastic suspension theory and the general good commercial balance of tires. In a sense, his comment was confirmed by two or three other speakers who dealt with practical and theoretical aspects of the shimmy question.

Below: Walter C. Keys contributed a paper on rubber spring mountings to the chassis session program



Above: Causes of wheel shimmy was the subject of a paper read by K. L. Herrmann

Mr. Plum's paper attacked the skid problem from a viewpoint which was novel and refreshing to the members at the meeting. His reasoning follows channels different from those usually used by American engineers, but his conclusions, which are abstracted here, offer information pertinent to the analysis of the causes of skidding. He said:

Because a car with revolving wheels is never traveling continuously for any length of time in a mathematically straight course, a car is always under the influence of a transverse force. As long as the wheels are revolving they possess a "sense of direction" which resists the transverse force, and enables the car to be steered. Consequently it is undesirable to lock any set of wheels under any condition.

But when a set of wheels lock, they instantaneously cease to function as wheels, and the car is to all intents and purposes mounted upon rubber covered stilts, which move in whatever direction the forces acting upon them may cause them to move.

By analyzing the motion of a car on which a set of wheels is locked, it has been seen that the rolling of the rear wheels is just as important, if not more so, to the steering ability of the car, as is the rolling of the front wheels. Consequently, there is no cause to fear locking the front wheels in preference to the rear wheels.

The retarding forces at the front wheels cause a "spin effect," a force which does not influence the motion of the car as long as the rear wheels are revolving. Consequently, from the standpoint of pivoting, "front-wheel brakes only" is not in the least dangerous. But the use of front-wheel brakes simultaneously with rear-wheel brakes is a dangerous combination of braking equipment, if they are not combined in the correct proportion.

When discussing the correct proportion of distribution of the braking force, it is not only necessary to design a method of four-wheel braking which is acting in a pleasant, smooth, and yet effective manner, but it is also essential to provide a method which is safe to use in an emergency stop. In order to simplify this problem it is necessary to treat dry and wet weather driving conditions separately.

In fair weather the total amount of friction available between the dry road and the tires is comparatively great. When using four-wheel brakes the problem is, therefore, not to provide sufficient deceleration force to stop the car. On the contrary, the problem is to design a distribution of the braking force to the front and rear wheel brakes, which, in spite of the change of "effective weight," will prevent the driver from making a too violent stop of the car, causing the dangerous "fair weather pivot." When two-thirds of the braking force is distributed to the rear wheels, the preponderance of the stopping force will remain active behind the center of gravity of the car, causing the "drag-anchor effect" to counterbalance the "spin effect," and no "fair weather pivot" can occur.

In skiddy weather the friction available between the wheels and the skiddy road is comparatively small. The retarding forces available at the two sets of wheels, front and rear, should be utilized to the utmost so that there will be the least possible chance of locking any of the wheels during the period of braking. Owing to the change of "effective weight" from the rear wheels to the front wheels, the brakes of the latter will resist much greater pressure from the foot pedal before locking than will the brakes of the rear wheels. Consequently, a greater braking force should be distributed to the front wheels than to the rear wheels.

It has also been seen that the pivoting forces "build up" to a maximum when the braking force at the front wheels is of an amount just insufficient to cause them to lock when the rear wheels are locked. But if the front wheels are locked momentarily before the rear wheels, all pivoting forces become instantaneously eliminated, and the car will pursue a more nearly straight-ahead course. In addition to this lock of pivoting, steering may always be regained at any instant by releasing the brakes.

Never Such *Interest* in

By Julian Chase

Directing Editor,
Chilton Class Journal Publications

SHOW attendance records have been broken everywhere this year. At New York, Philadelphia, Cleveland, Buffalo, Detroit and Chicago, crowds have come to the shows in increased numbers

After 27 years of automobile shows, this year's attendance is greatest ever

AFTER 27 years of automobile shows in this country, the 1927 shows, so far as they have as yet been held, have broken all records for attendance. At New York, Philadelphia, Cleveland, Buffalo, Detroit, and now Chicago, crowds have come to the shows in increased numbers. Never before have so many prospects *paid* to see what the industry had to sell them.

Why is it so? Why, this year particularly, has there been increased attendance? That is something worth looking into, for when things grow it is well to study why they grow so that we shall know how to keep them growing. And this particular business of ours, while a long way from having got its growth yet—is destined to be a much bigger giant than it is today—will grow faster and keep on growing without undue setbacks if those who nurture it study how and why it grows.

There are offered to us several explanations for the record-breaking 1927 show attendance. Different automotive executives will say different things first. The country is prosperous—most of it; everyone has a lot of money and wants to spend it; there are more automobile owners; there has been more pre-show publicity—Sam Miles will tell you that. All quite true, but when it is boiled down, when we take into account that the increased show attendance has been out of proportion to the increase or improvement in any of these factors, when we get at the thing that really capitalized the opportunities which the others have provided, isn't the prime and active reason the fact that the automobile manufacturers, this year, have given the automobile public more to think about, more to talk about, and more to want than they have for a long time past?

New and Better Cars

The crowds have come to see the new and *better* cars.

At the New York show, which is mentioned specifically only because it was the one at which the picture was first disclosed, among 44 makes of cars exhibited there were 15 new chassis models, an unusually large percentage; and they were new chassis models, not old chassis models with body details slightly different. There was something to talk about and it was talked

Shows Before-WHY?

¶ *There may be arguments against new models from the production point of view, but the new models this year are responsible for the most successful show season in automobile history. They draw the crowds!*

¶ *The automobile manufacturers, by producing new and better cars, have given the automobile public more to think about, more to talk about, and more to want than for a long time past.*

¶ *It may be a long step from a sold show ticket to a sold automobile, but who will say that the number of show tickets sold is not an indicator of the possibilities of automobile sales?*

¶ *There is an object lesson in the shows of 1927.*

about in the newspapers and in the salesrooms and on the streets before the show opened, and the crowds came because they wanted to see what they had been told. There was talk of small cars, of smaller cars, of better cars, of more economical cars, but there was no talk of cheaper cars—which is significant.

Wherever there is money, there is money to buy automobiles, no more so because those who buy them want them than because they need them. And when they buy they will pay for what they think they ought to have. This has been demonstrated.

The same thing in the new cars which drew added thousands to the shows will be in them when the shows are past, but the keen curiosity about them will be somewhat dulled by time if the industry from maker to dealer does not stick to the task of keeping it acute.

It may be, as we all know it is, a long step from a sold show ticket to a sold automobile, but who will say that the number of show tickets sold is not an indicator of the possibilities of automobile sales. It must be so. If the promise of better cars sold more show tickets, will not the fulfillment of that promise, supplemented by wide advertising of the fact, and active merchandising along the same line of thought, sell more automobiles? Why shouldn't it?

Our extra show tickets were sold undoubtedly to previously unstimulated old buyers as well as to new ones, which leads us to a thought on competition. Too much talk of competition, of our entering a period of active competition among makes of cars or among dealers, is destructive. Nothing will check buying more effectively. Competition popularly, although not truly and necessarily, means price reduction, and who will not wait a bit in buying if he thinks delay will mean a better bargain?

Let's embrace the vision and enthusiasm of some Jordan and see that our industry which is big today is small in comparison with what it will be when we are gone and forgotten. Let us look for and uncover the untouched potentialities. After we have really gauged the extent of our home market, let's count the cars in all the rest of the world and compare the number with that which this country boasts. Let's look at the truck and delivery wagon field. Let's consider the bus business.

Today we are like fishes swimming in a cove. Outside is a lake in which there is much more than room for all. Outside lie opportunities for sales development that have as yet not even been approached. The doorbell-ringing era in automobile selling is still ahead of us. The two-car family idea has not much more than been discovered. And when we do really go out after business, when we do really intensively and scientifically dig up prospects we shall find that there are so many of them that no one needs to steal any from anyone else to get all that he can use. Ask R. H. Grant about it.

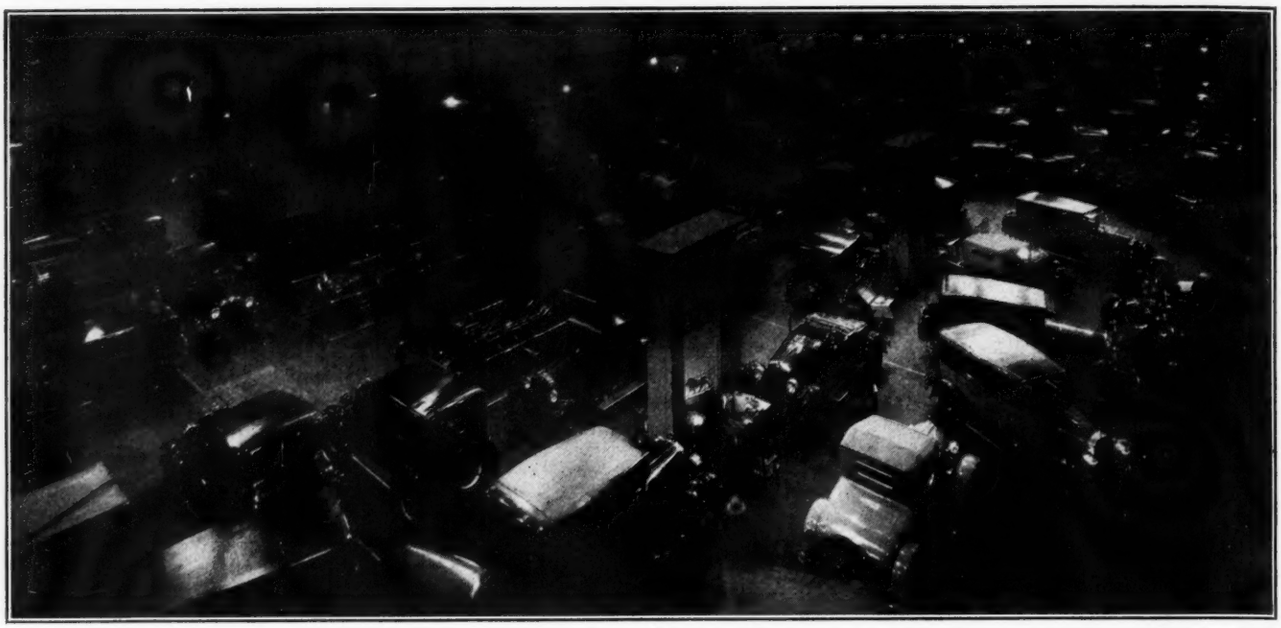
The shows have shown again that even the automobile industry must be up and doing and that when it is and does the response in stimulated interest is immediately apparent. No one, not even the big fellows with their tremendous plants, their high-priced and efficient executives and engineers, their wide-flung and thousands-strong dealer organizations, their millions of dollars' worth of advertising, can stand still and hold his own. Those of us who have watched this thing from the beginning have seen big ones slip because they were not progressive and we have seen little ones grow into big ones because they were progressive. And so it will always be.

The automobile industry must move ever onward. It must eternally pursue that elusive objective, the better car. It can never be satisfied that it has it. Complacency, even for big fellows, is just another way of spelling bankruptcy.

Let some Kettering give us a glimpse into the minds of our research engineers at any time, at any stage of practical progress, and we shall see the extent of things still left undone.

There are many miles now unused in a gallon of gasoline, there is much yet to be sought in comfort, convenience, simplicity and performance, so that for years to come the builders will have new things with which to draw increased crowds to the shows and the dealers will have new things to sell to those whom the shows draw to them.

There is an object lesson in the shows of 1927.



General view of the main hall of the Coliseum, taken just before Chicago's 27th annual automobile show opened last Saturday

New Body Models Make Appearance at CHICAGO SHOW

Latest additions to Nash, Marmon, Pierce-Arrow and Chrysler lines exhibited. Record-breaking crowds on hand.

By Norman G. Shidle

RECORD-BREAKING crowds seething and milling through the narrow aisles and booths, already crowded with motor vehicles marked the opening of the 27th annual Chicago National Automobile Show at the Coliseum on Saturday afternoon, Jan. 31. A few new body models in addition to those exhibited in New York made their appearance, but for the most part the cars shown were the same as those displayed at the eastern show a few weeks since.

The Chicago exhibit appeared to be slightly less colorful than its New York predecessor, some companies having apparently omitted from their booths one or two of the more strikingly-hued models which were previously presented. Even so, there are plenty of pleasing and attractive color combinations in this show and one or two of the new body models which appear are particularly noticeable in this respect. An innovation was the replacement of the usual band by an orthophonic Victrola equipped with amplifiers, an experiment which was more than successful.

Buying appeared to be quite good during the early days of the show, some of the smaller manufacturers particularly being unusually well pleased with the interest which their products were getting. While the number of factory executives in Chicago as the show opened probably was smaller than in previous years, those who were on hand were feeling much better about immediate prospects for business than they did a week or so ago.

Following very slow sales toward the end of December and a somewhat disappointing showing in the early weeks of January, a number of makers report a noticeable quickening of demand now. The trend of production seems certain to be upward in February and a few executives even claim to see possibilities of a shortage of cars before the middle of March. This latter opinion, however, is held by a minority rather than a majority of companies at the present time. It still is the general belief that total output for 1927 will run somewhere around the same total as 1926, with the first quarter of this year probably somewhat behind the similar period last year.

The unusual interest which has been exhibited in the national shows, however, as well as in the various local exhibitions thus far held, has spread a cloak of optimism over a large part of the factory personnel and the probability of a sound year from which satisfactory profits will accrue grows greater as the weeks pass.

The truck exhibitors were particularly pleased with the results of the first few days of their Chicago show-

ing. Several makers made sales in the early hours of the show and practically every booth reported many interested and inquiring visitors.

Again, the special shop equipment exhibit—for the first time a part of the Chicago show—went across in excellent manner, as it did in New York and as it has been doing at the local shows. Following the report that one shop equipment maker sold a large order of goods in the hour before the closing of the New York show, exhibitors in Chicago planned to maintain their booths and selling efforts at maximum efficiency until the doors closed.

Part of the truck exhibits at the Chicago show

The power of these shop equipment exhibits in emphasizing the dominant position which service is taking in the automotive merchandising scheme is being recognized more fully by car factory executives. Not only are these special exhibits resulting in a certain number of extra sales for shop equipment manufacturers; they also are focusing the attention of the trade more strongly than ever on the need for better service as an integral part of future automobile selling. They are serving to visualize and particularize the generalities about automobile service which have been preached for several years back and, as they are continued in future years, seem certain to operate as a powerful force in the improvement of maintenance work.

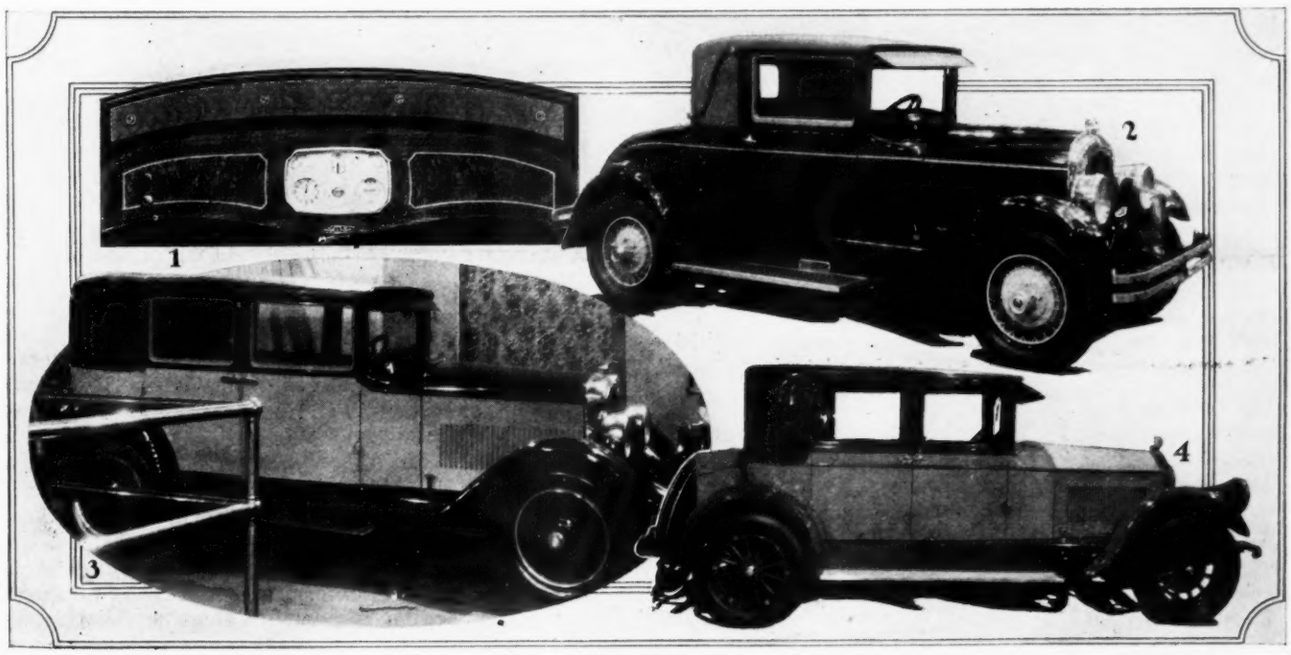
There is a disposition on the part of some far-seeing car factory executives to use the interest generated by the shop equipment exhibits to drive home again to their dealers those principles and methods of better service which they have been urging in the past. The shop equipment exhibits have fanned the flame of service interest among dealers so that it probably is glowing at least a little brighter than ever before; many vehicle manufacturers probably will see the excellence of their chance to keep that flame burning during the rest of the year.

Accessory and parts exhibits also attracted much attention as usual.

Price revisions were conspicuous by their absence as the Chicago show opened, the ones of most importance probably being the increase of $10 which Studebaker has made on its Erskine line, and the $500 reduction made by Jordan on his Model J line eights. The relative stability maintained by the car price structure throughout the show periods this year is partly responsible, in the opinion of many executives, for the rather good buying which has been experienced. It seems unlikely the industry ever again will let itself get caught in the throes of a price war just as it is attempting to open a year's selling season.

New models not previously announced nor shown at New York were few and far between, as previously noted. Pierce-Arrow, Nash, Marmon and Chrysler introduced new body combinations, but no new chassis made their first appearance in Chicago.

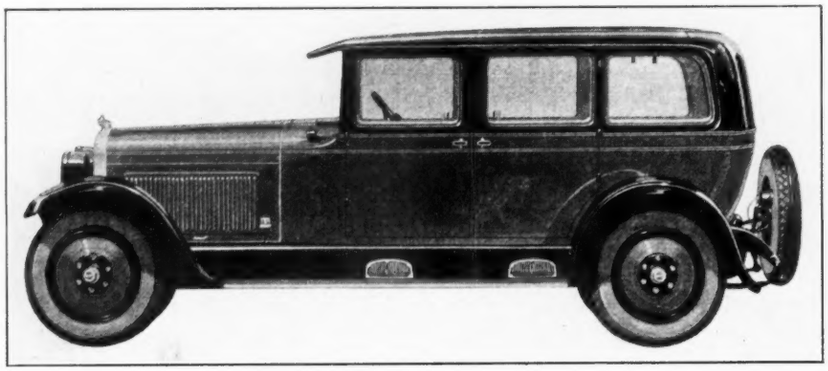
The new Pierce-Arrow model is a four-door club sedan built on the Series 80 chassis with a wheelbase



1—Walnut instrument board on Nash Advanced Six "Special" sedan. 2—Chrysler's new sport coupe on the "70" chassis. 3—Little Marmon custom sedan, one of four new custom jobs introduced at Chicago. 4—New Pierce-Arrow custom sedan

of 130 in. The factory price is $3300. A trunk on the rear is standard equipment. Appointments include door pockets, dome and side lights, vanity cases and the like. A decorative feature is the use of a strip of tapestry lace across the upholstery of each of the doors, just below the window sill. This tapestry is surrounded by a mahogany finished frame. Any one of 26 color combinations may be had.

Chrysler is exhibiting a coupe with wire wheels, the body and fenders of which are finished in brown. Cream striping completes the special finish on this car, which is mounted on the regular Chrysler "70" chassis.



Nash "Special" sedan on the Special Six chassis

Following the introduction of the Ambassador and Cavalier models at the New York show, Nash disclosed at Chicago for the first time two other new models of the same general character in design but priced so as to appeal to a wider market. These are known as the "Special" sedans. One is mounted on the Advanced Six chassis while the other is on the Special Six series. The finish of the Advanced Six model is a new shade of gray-green which contrasts with black running gear and upper structure. The window reveals are also in gray-green. The disk wheels are gray-green and, like the deeper green body moldings, carry a double stripe in gold.

For the "Special" sedan on the Special Six chassis a blue has been employed for the body and wheels. The body molding is black, as are the running gear and upper structure. Buff is used in the double striping of both the wheels and the body molding. Window reveals have the blue tone. Both models have Chase Velmo mohair velvet upholstery in a gray tone and the steering wheel of each is of walnut. The inside window moldings and door panels are also of walnut finish with a contrasting ivory stripe in the door panels. To complete the harmony of the interior ensemble, the instrument board is of walnut finish, as is the crowned panel directly above the instrument board.

Marmon introduced four custom bodies on the Little Marmon chassis. These bodies are special built and the equipment is luxurious and complete. The bodies are offered in a variety of color combinations. The four styles in this line are the two-window sedan at $2595, the three-window sedan at $2595, the victoria coupe at $2595 and the town cabriolet at $3125.

Annual Salon at Drake

In accordance with past custom at Chicago, the annual salon at the Drake Hotel is running concurrently with the automobile show at the Coliseum. The opening of the salon on Saturday, Jan. 29, found exhibiting makers rather optimistic. It was estimated by executives present that in the last two years the business of the custom coach industry has trebled. Makers are displaying this year 74 different bodies against 56 in 1926. There is one more manufacturer in the salon, contributing two of the body styles. The average number of body types per exhibitor is larger, their offerings ranging from nine downward.

Weymann, now producing at Indianapolis, is in the salon for the first time with two flexible body styles, one a dark maroon two-seated collapsible coupe with rumble seat inside, which was displayed in New York, and the other a four-door sedan surfaced with especially made Zapon leather in a very deep green, almost black, that is being turned out on special order at the company's Indianapolisplant. Both of these bodies are on Stutz chassis. A body similar to the latter, also on a Stutz, but with gray sides and dark green top, was held in readiness outside the Drake for demonstrations.

Down the aisle a short distance from the Weymann exhibits, the Fabric Body Corp. of Detroit displayed a sedan, on a Marmon chassis, with fabric body built under the Childs system. Appearing at a distance to be a creation of silver, this body has an outer surface which is fabricated with Meritas metallic brocade in silver gray with mulberry trim and mulberry broadcloth upholstery. The car carries a radio set in the instrument board, an expanded metal lath used in the body's construction serving as the antenna.

Coach makers displaying bodies on chassis not their own, are, Brewster, Brunn, De Causse, Derham, Dietrich, Fleetwood, Fisher, Holbrook, Judkins, Le Baron, Willoughby, Locke, Fabric Body and Weymann.

Cars shown with bodies made by same companies making the chassis are: Cunningham, Isotta-Fraschini, Rolls-Royce and Minerva.

Chassis mounting the different custom bodies were: Cadillac, Cunningham, Duesenberg, Franklin, Isotta-Fraschini, Lincoln, Marmon, Minerva, Packard, Pierce-Arrow, Rolls-Royce, Stutz.

Valentine Color Schemes

MAN has accomplished much in the way of devising effective color harmonies with which to decorate his surroundings but old Dame Nature still stands high as a developer of color contrasts. The latest exploit of the Valentine Co. has taken man one step nearer to nature in this work. The many multi-colored stones which are to be found in nearly every locality as well as colored precious and semi-precious stones from all over the world are used by Valentine as master designs for a new line of automotive color combinations.

Since many of the minerals from which colors have been taken contain three, four and more colors, the number of different combinations of upper and lower paneling, belts and stripings which may be obtained from a single design is great. Valentine Co. already has a considerable number of these combinations made up in large sheets and their appearance in mass in no way denies the possibilities seen in the stones themselves.

EDITORIAL

Price Cuts and Repossessions

WHEN an automobile factory makes a drastic price cut or drastic change in models for which the distributing organization has been inadequately prepared, the serious consequences for the used car market are well understood. But the effect of such moves travels even farther. Repossessions of new cars in the line involved are almost certain to take a sharp turn upward.

A car is only repossessed when the buyer, unable or unwilling to keep up his payments, is unable to transfer ownership of the car for more than he owes on it. Then the dealer or finance company has to step in, another used car has to be sold, and another loss is recorded for the holder or indorser of the note.

Just a very few lines of cars were the source of a large part of the difficulties for finance companies toward the end of 1926. And in each there was a record of heavy depreciation of used car values.

Catalysts in Electro-Deposition

THE use of catalytic agents in purely chemical processes is well known. Probably their most important industrial application is in the synthetic production of ammonia, wherein the elements of the atmosphere, oxygen and nitrogen, are combined into nitrous oxide under the influence of pressure and heat and in the presence of a catalyst. They seem to be destined to play an important role also in the production of the motor fuels of the future, because in the presence of certain of these catalysts, such as finely divided iron or nickel, carbonaceous material and hydrocarbons of heavy, non-volatile types can be combined with hydrogen or additional hydrogen and thus converted into light and volatile liquid fuels.

Recently catalysts have been introduced in processes of electro-deposition. With certain metals, such as copper and nickel, it is comparatively easy to obtain uniform, adherent coatings, but with others it is far more difficult to secure satisfactory results. It has now been found that in many cases catalytic agents furnish the solution to the problem of plating with these metals.

One of the requirements is that the cathion of the salt which forms the catalyst must not be deposited as a metal on the cathode. Even small additions of such a catalyst often give remarkable results. The electrolytically deposited layer becomes more uniform and its grain finer. Of course, if the metallic element of the catalyst should be deposited on the cathode the result would be undesirable, the more so if this element does not alloy well with the metal to be deposited.

The solution of the chromium plating problem has been sought along these lines. It has been found also that aluminum salts have a favorable influence on the deposition of iron, copper and zinc. This effect seems to be due to the formation of colloidal hydrates by the hydrolysis of the catalyst salt.

It is not improbable that the introduction of catalysts in electro-deposition will lead to far-reaching developments, and considerable activity in this field may be looked for during the next few years.

Shows Attract Truck Buyers

AFTER their gratifying experiences at New York, Buffalo, Cleveland, Chicago, and smaller towns, exhibitors of commercial vehicles at the automobile shows have unanimously decided in favor of these mixed exhibitions.

Not only is there a bigger general public interest in business vehicles, and a stimulation of retail business at the shows, but truck dealers appear to be seizing the opportunity of visiting the commercial section and placing orders.

One exhibitor was called upon by more than 50 national account buyers, one of them coming over 1200 miles. Other manufacturers report similar interest and what is better, tangible business.

No doubt the general trend toward commercial vehicles that are the equal of private cars in beauty of line and color has much to do with the public interest, but whatever the cause the fact remains that the business vehicle stands are as eagerly inspected as many of the private car stands. Then, too, the truck user is more and more becoming alive to the value of appearance, and recognizes the advertising value of smart lines and paintwork.

From the viewpoint of the exhibitor, it appears that he scores in every direction. Dealers, buyers and the general public—and the last named has a distinct influence on the market—take advantage of the presence of the truck exhibits at the automobile shows. Were the shows confined to business vehicles this interest would undoubtedly be very much lessened.

Only one criticism has been heard, and that is that the business vehicles usually are pushed away in a corner, away from the main portion of the show. As one other exhibitor pointed out, however, this has the advantage of tending to conserve the space to those genuinely interested.

AUTOMOTIVE NEWS SECTION INDUSTRIES

Philadelphia, Pennsylvania

Saturday, February 5, 1927

Factories Increase Schedules as Shows Stir Sales Interest

PHILADELPHIA, Feb. 5—Evidences of a general continuance of interest in motor cars is found in reports from cities, both large and small, in which exhibitions for 1927 thus far have been staged. There is noted a shifting in public attitude toward some cars which have had the benefit of remodelling in the recent past, a change in attitude which may be significant of a change in buying preferences.

Some of the factories which have shown new models already are deep in production, with dealer orders reported piling up as result of favorable showings of these cars. In other factories there is a gradual broadening of production schedules with indications that large production will be effective toward the latter part of February. January output, though considerably in excess of December, will be much below the totals of succeeding months.

Retail developments during January for the most part have shown a condition of slow business, with some cities, however, getting a good start on an active season. Where business has been good there has been a combination of an automobile show and good weather. Only fair business was reported where either of these factors was absent.

The general dealer situation, however, is reported much more favorable than a year ago, with regard to both new and used car stocks. There is a marked trend toward more conservative

(Continued on page 176)

Hudson Fixes High February Schedule

DETROIT, Feb. 3—Hudson Motor Car Co. has entered on the largest manufacturing schedule for February in its entire history, with a daily output of 500 Hudsons and 700 Essex. Since the introduction of new cars the first of the year, distributors and dealers have been urgent in asking for additional shipments.

In January 12,000 Essex cars were shipped. The new Hudson Super-Sixes went into production Feb. 1. The 500-a-day schedule on Hudsons is the largest in the company's history. Many factory departments have gone on a two-shift-a-day basis.

Reports by other companies show large early year operations. Buick is operating on a schedule exceeding 1000 cars daily with a total of 22,000 scheduled for February. January output was 18,260 as compared with 12,000 in January, 1926.

Chevrolet February production will approximate 75,000 cars and trucks. January output was 73,000 as compared with 44,000 in January, 1926. Oakland built 5824 Pontiacs and 2217 Oaklands in January as compared with 1476 Pontiacs and 4309 Oaklands.

Paige-Detroit shipments in January totaled 1590 and February schedules are for 2285.

Campbell Assumes Star Sales Work

CHICAGO, Feb. 1—T. S. Johnson, who has been assistant to Colin Campbell, vice-president of Durant Motors, Inc., has been named sales manager of the Flint division, with headquarters at Elizabeth, N. J., it was announced today by Mr. Campbell.

The Flint division will have a separate sales organization from the other Durant interests, Mr. Campbell said, and the appointment marks the beginning of the new policy, which will be aggressively pursued with the object of expanding the division.

Mr. Campbell also announced the resignation of George Frank Lord, sales manager of the Star division. No successor has been appointed and Mr. Campbell will personally supervise Star sales activities. Mr. Lord, it is understood, is planning to go into business for himself.

Harrison Succeeds Stone as Delco-Remy Executive

CHICAGO, Feb. 1—George Stone has resigned as general sales manager of the Delco-Remy Corp. and has been succeeded by O. Lee Harrison. For a number of years Mr. Harrison was vice-president and sales manager of the Delco company until it was merged some months ago with the Remy organization, after which he continued with the General Motors Corp. in another capacity. Mr. Stone has not been in good health for several months and he is resigning that he may recuperate in Florida. He was connected with the Remy organization 17 years.

Boeing Gets Air Contract

WASHINGTON, Feb. 3—Postmaster General New has awarded to the Boeing Airplane Company of Seattle, Wash., a contract for carrying mail by air on the western section of the transcontinental route, between Chicago and San Francisco. The bid was $1.50 per pound for the first 1000 miles and 15 cents a pound for each mile additional. The route is 1906 miles long.

All bids for the section from New York to Chicago were rejected.

Exports of British Automotive Products Show Increase Over Imports in 1926

LONDON, Jan. 16 (*by mail*)—The following table shows the British automotive imports in 1926 compared with 1925:

	1925		1926	
	Number	Value	Number	Value
Cars	32,852	£6,194,539	12,064	£1,932,708
Commercial vehicles	655	113,339	703	117,190
Chassis	15,778	2,206,898	10,436	1,401,269
Parts	...	2,734,251	...	2,798,229
Casings	...	3,016,656	...	3,957,251
Inner tubes	...	457,839	...	585,416
Solids	...	393,137	...	307,091
Total value		£15,116,659		£11,099,154

British exports for the two years are shown below:

	1925		1926	
	Number	Value	Number	Value
Cars	17,771	£4,183,656	14,865	£3,233,510
Commercial vehicles	1,544	881,402	1,148	568,409
Chassis	9,735	2,347,194	17,124	3,498,889
Parts	...	2,009,282	...	1,819,092
Casings	...	3,015,660	...	3,380,569
Inner tubes	...	648,460	...	701,765
Solids	...	415,124	...	441,685
Total value		£13,500,688		£13,643,919

Industry to Get Large Tax Refund

Question of Right of Manufacturer and Consumer Disturbs Congress

WASHINGTON, Feb. 3—After four days of debate, conferees of the Senate and House were unable to reach an agreement as to the method of reimbursing automobile, truck, engine and body manufacturers of a sum ranging between $30,000,000 and $50,000,000 illegally collected under the excise tax laws.

Authority for repayment of the illegally collected tax was authorized in the urgent deficiency bill. When the measure passed the House a rider was attached making it obligatory upon the manufacturer, dealer, etc., to give a bond to the Government that the tax refund would be passed on to the ultimate consumer, who paid it.

This proviso was knocked out by the Senate, on motion of Senator Smoot. The Senate declared that there was no practical way in which the refund could be traced back through the manufacturer, jobber, dealer to consumer and instructed its conferees to stand pat on the Senate's action in eliminating the rider. House conferees are equally as adamant.

Contention of the automobile manufacturers is that aside from the fact that it would be utterly impossible to reach even 10 per cent of the ultimate consumers and make the rebate, that many of them paid the tax themselves and are entitled to the refund. Under the House rider if the manufacturer is not able to reach the consumer and make the rebate the money must be returned to the treasury.

Altogether 92 items are included in the list on which the Government originally assessed the tax, but which were one-by-one declared illegally collected and which are included in the refund. The major items include: Drive sprockets, grease guns and cups, tire valve parts, gaskets, coil springs, rivets, bolts, nuts, washers, bearing cages, fire apparatus, trailers, coils, timbers, bearings, piston rings and pins, battery, carburetor and generator parts, starting motor parts, dome lights, body hardware, window and door glass, drive chains, battery parts, tire carriers, headlight brackets, drain cocks, horn and switch parts, and spark plugs.

M.& A.M.A. to Make Survey of Warehousing Methods

CHICAGO, Feb. 3—A survey and analysis of warehousing methods of service parts manufacturers, with a study of policies as regards freight allowance on returned parts, will be undertaken by the Motor & Accessory Manufacturers Association. Neal G. Adair, manager of the sales development department of the association, will be in charge.

The shop equipment group of the M. & A. M. A. unanimously voted the shop equipment exhibits in the national shows a great success. It was decided to proceed with the same plan next year, probably with some enlargements. Reports from local shows indicate the shop equipment exhibits have also scored favorably.

New Prices Fixed on Leading Lines

CHICAGO, Jan. 29—Coincident with the opening of the Chicago Show, Jordan announced price reductions of $300 to $500 on the model "J" light-cylinder line. Revisions were announced on the Erskine line and prices on the new Stearns-Knight were announced. Price developments follow:

Jordan

	New Price	Old Price
Sedan	$1695	$2195
Victoria	1695	2195
Sport Coupe	1695	2195
Playboy	1545	1845

Erskine

5-passenger tourer	$945	$935
2-passenger coupe	945	985
5-passenger sedan	995	985
2 to 4-pass. custom coupe	995	985

Bumpers, front and rear, are included at these prices.

Stearns-Knight

2-passenger roadster	$3850
4-passenger touring	3850
Cab-roadster	4250
Coupe	4250
5-passenger sedan	4350
7-passenger sedan	4450
5-passenger limousine	4550
7-passenger limousine	4650
Chassis	3550

Hughson Heads N.A.D.A.

CHICAGO, Feb. 2—W. L. Hughson, San Francisco, was elected president of the National Automobile Dealers at the annual meeting this week. C. C. Coddington, Charlotte, N. C., was elected first vice-president; W. E. Griffith, Toledo, second vice-president, and F. W. A. Vesper, St. Louis, treasurer.

Directors elected are: R. P. Taber, H. E. Kinner, Rudolph Jose, G. G. G. Peckham, W. V. Harrington, H. R. Brown, A. D. Plughoff and Tom Botterill.

Lynn M. Shaw resigned as assistant general manager to enter special dealer consulting work. He will be succeeded by A. C. Faeh.

New British £100 Car

LONDON, Jan. 16 (*by mail*)—The Zealandia, selling for £100, is to be put in production by the Zealandia Motor Co., London. Experimental models are stated to have proved satisfactory.

Business in Brief

Written exclusively for* AUTOMOTIVE INDUSTRIES *by the Guaranty Trust Co., second largest bank in America.

NEW YORK, Feb. 5—The volume of trade and of industrial output remained fairly large last week, although bad weather restricted activity in some lines. The textile trade continued to report an exceptionally active demand. Commodity prices in general resumed a downward trend, while stock prices also moved toward lower levels. Money rates continued to reflect ease in the market for short-term funds.

LIFE INSURANCE

Sales of ordinary life insurance in 1926 were larger than in any other year, the total being estimated at 4 to 5 per cent above the figure for 1925. Every section of the country reported a gain of at least 2 per cent for the year.

FREIGHT CAR LOADINGS

Car loadings in the week ended Jan. 15 numbered 950,045, which compares with 940,800 in the preceding week and 931,735 in the corresponding period last year. The gain over last year's figure is entirely due to larger shipments of coal.

BANK DEBITS

Bank debits to individual accounts reported to the Federal Reserve Board for the week ended Jan. 26 were 8.6 per cent below the total of a week earlier but fractionally above that of a year ago.

FISHER'S INDEX

Fisher's index of wholesale commodity prices stood at 145 last week, as against 146 a week earlier and 146.1 four weeks earlier.

FEDERAL RESERVE STATEMENT

Bills and securities held by the Federal Reserve Banks declined $96,400,000 during the week ended Jan. 26, with decreases of $50,900,000 in discounts, $35,500,000 in open market purchases and $10,000,000 in holdings of Government securities. Note circulation declined $21,400,000 and deposits $72,500,000, while reserves increased $37,400,000. The reserve ratio rose from 76.9 to 79.6 per cent.

During the same period, loans of reporting member banks declined $71,000,000, with a gain of $6,000,000 in loans secured by Government obligations more than offset by decreases of $43,000,000 in loans secured by stocks and bonds and $34,000,000 in "all other" loans. Investments increased $22,000,000, while borrowings from the Federal Reserve Banks declined $51,000,000 and net demand deposits $149,000,000. Loans to brokers and dealers, secured by stocks and bonds, made by reporting member banks in New York City declined $38,000,000.

Money rates were practically without change last week, the call loan rate remaining at 4 per cent.

Insurance Danger Sounded by N.A.F.C.

Bills Now Pending in 13 States Warns Association—Says Farmers Most Hurt

CHICAGO, Jan. 31—Bills providing for compulsory liability insurance for all motor vehicle owners and operators have been introduced in the Legislatures of 13 states, according to a bulletin issued by the National Association of Finance Companies. Most of these bills are along the lines of the compulsory liability insurance law now in effect in Massachusetts. The states in which these bills have been introduced are: New York, Minnesota, Nebraska, Ohio, Tennessee, Connecticut, New Jersey, Alabama, North Carolina, Indiana, West Virginia, New Hampshire and California.

The National Association of Finance Companies urges its members and all automobile dealers and owners to oppose the passage of these bills. A bulletin sums up as follows:

"Compulsory automobile liability insurance is premature and will not prevent accidents, but is likely to increase accidents because some motorists, when protected by insurance, think they need not exercise much care while driving. It will not influence drivers of cars owned in other states having no such law, unlicensed drivers, hired drivers, or criminals. It will increase the number of false and unwarranted claims, litigation and expense.

"It imposes a liability without fault and will compel careful drivers to pay for injuries done by careless and irresponsible drivers.

Premiums Would Exceed Claims

"It will increase total premiums from about $100,000,000 to about $500,000,000, a burden enormously in excess of uncompensated accident claims which do not exceed 10 per cent of proposed compulsory premiums.

"It will increase premium rates because risks cannot be selected, thereby undermining the soundest principle of underwriting. The majority of motorists in larger cities now carry automobile liability insurance. Very few farmers carry public liability insurance, because their risk is negligible. They will suffer most if the bill is enacted. The average driver has one accident in 20 years, but even with the occasional accident, there is no assurance that the injured will receive compensation for the reason that there can be no recovery if the motorist is not at fault."

Establish Chicago Branch

CLEVELAND, Feb. 1—Cleveland Piston & Mfg. Co. has opened a branch in Chicago to carry a complete stock of products for the wholesale trade of the Middle West.

INSURANCE A BLOW TO USED CARS—A.A.A.

WASHINGTON, Feb. 2—Renewed opposition to state and federal compulsory automobile insurance was voiced this week by the American Automobile Association in an appeal to its affiliated clubs to oppose such measures, individually and collectively.

The effects of such insurance, the association declares, "would prevent hundreds of thousands of people from buying automobiles and the knowledge by a purchaser that he must spend $25 or $30 for compulsory insurance would make it almost impossible for the dealer to dispose of many second-hand cars. This would be but the first blow," the association declares.

"The effect of it would be immediately felt throughout the entire automotive industry as it is a well established fact that there is a definite ratio between the number of new and used cars sold."

Hupp to Spend $4,500,000 for Advertising in 1927

CHICAGO, Jan. 29—Before the automobile show opened here today there was a Hupmobile sales meeting held in which it was pointed out by Frederick E. Dickinson, advertising manager, Hupp Motor Car Corp., that $4,500,000 would be spent in 1927 for direct mail campaigns and for advertising in general mediums.

An indication of the general sales prospects was shown in the placing of an order by Gambill Motor Co. for $3,230,000 worth of Hupmobiles for delivery within the next 10 weeks. The meeting was attended by DuBois Young, president, six other executives from the factory and by 270 dealers and salesmen.

Canada Outlook Favorable

WASHINGTON, Jan. 31—With a steady increase in agricultural and industrial production throughout Canada, prediction is made by the American Trade Commissioner at Ontario, in a report to the Department of Commerce, that "all indications are favorable for larger sales of automobiles in the Dominion this year. On Nov. 1 automotive registration throughout the Dominion was 809,303.

Elected N.S.P.A. Members

DETROIT, Feb. 1—The Torrington Co., Torrington, Conn., and the Evans Flexible Reamer Corp., Chicago, have been elected manufacturer members of the National Standard Parts Association. Rhodes Motor Co., Pty. Ltd., Melbourne, has been elected a member under the new overseas jobber classification, the first company in this class.

Indian Motocycle Buys Ace Company

Will Manufacture Both Lines in Springfield Plant—Bauer Heads Board

SPRINGFIELD, MASS., Feb. 1—The Indian Motocycle Co. has purchased the manufacturing and patent rights, equipment, tools and merchandise for production of the Ace motorcycle, from the Michigan Motors Co. of Detroit. Equipment and parts will be removed to this city and both lines will be produced from the Indian plant, it is announced by the officers of the Indian company. This adds a de luxe four-cylinder line to the one-cylinder and two-cylinder models that the Indian has produced.

Plans for producing the Indian and Ace are as yet undecided, it is said, except that the two lines will be kept distinct. The Ace was formerly made in Philadelphia and more recently in Detroit. The Indian factory affords ample space for manufacture of both lines, but it will be some time before machinery and other facilities can be put in shape for actual production of the Ace.

Louis E. Bauer, formerly of Springfield, Ohio, where he was president of the Springfield Leather Products Co. and vice-president of the Bauer Bros. Co., machinery manufacturer, has become chairman of the board of directors of the Indian Motocycle Co.. The acquisition of the Ace patents and machinery is regarded by officials as a step toward large business for the Indian establishment.

Aircraft Engine Plant is Opened by Packard

DETROIT, Jan. 31—Packard Motor Car Co. has completed a building for assembling and testing aircraft engines. It is a one-story building, 60 x 126 ft. to which it is planned to add three more floors which will be occupied by aircraft engine departments. Orders now on hand for aircraft engines for the Army and Navy total $5,000,000. Four engines were recently sold for commercial purposes to the Scadtka lines in Colombia.

Costa Rica Raises Duty

WASHINGTON, Feb. 1—Effective today new import duties on automobiles into Costa Rica will be aproximately 25 to 50 per cent more than heretofore, depending on the price of the imported car, the tariff division, U. S. Department of Commerce is advised. There is no increase on cars priced up to $1000. From $1000 to $2000, the duty is increased from 0.40 colon per gross kilo to 0.50 colon, and on cars over $2000, the duty is raised from 0.40 to 0.60 colons. Parts are increased 25 per cent under the new scale.

North East to Make Ford Speedometer

Sales Plans for 1927 Discussed at Convention—Award Sales Honors

ROCHESTER, Jan. 29—Salesmen from all domestic branches of North East Service, Inc., held a two-day convention at the plant here this week at which a sales program for the coming year was mapped out and the results of last year reviewed. Particular attention was given merchandising plans for the new North East speedometer for Fords.

George L. Valentine, of the Atlanta branch was awarded the prize for highest ranking salesman in the three-month sales competition staged by the firm. He was given a solid gold pin at a banquet at the Hotel Rochester at which the results of the contest were announced. The Detroit branch was announced as the winner of the contest among branch offices.

The salesmen were called together by Warren K. Lee, sales manager of North East Service, Inc. The program included addresses by Edward A. Halbleib, general manager of the North East Electric Co. and R. J. Kelleher, general manager of North East Service, Inc., and Mr. Lee, who spoke on sales features in regard to service on North East equipment. C. W. Coapman, treasurer of North East Service, outlined the ideal accounting system for service stations.

In conjunction with the advertising program there was an address by G. R. Fessenden, advertising manager, who outlined plans for the coming year's campaign.

Push Timken Bearing Units

CANTON, OHIO, Jan. 31—The new units of the Timken Roller Bearing Co., now under construction will be ready for operation about March 1. These units, part of the general plan of expansion of the company, have been pushed at rapid rate in order to give the concern the increased steel mill facilities needed at this time.

High grade electric furnace alloy steel is being produced already on a scale surprising other producers. The present capacity includes five electric furnances of the Heroult type with a normal capacity of six tons.

Gardner Sales Gain 51%

ST. LOUIS, Feb. 2—Gardner Motor Car Co. reports sales in 1926 exceeding 1925 business by 51 per cent. The company increased its distribution organization during the year and plant facilities were improved to permit of doubled production. With its entire output now centered on eight-in-line cars, the company is sanguine of further increases in 1927.

FORD GIVES COOLIDGE LINCOLN LIMOUSINE

WASHINGTON, Feb. 1—A Lincoln limousine, the gift of Henry Ford, was this week presented to President Coolidge, bear the presidential insignia and will be used as the President's private car, bearing the traditional tag, "D. C. 100."

This is the first time, since automobiles came into use at the White House as the conventional mode of travel, that anything but another well known make has been used.

Each year a new fleet of cars has been rented to the government for use of the White House and State Department. At the end of the year these "used" cars were sold, bringing in many instances more than the original sales price because of their perfect upkeep.

G.M. to Make Parts in Stockholm Plant

NEW YORK, Feb. 1—Reports from Stockholm, Sweden, indicate General Motors Corp. is making plans to erect a large automobile factory there. To this end the corporation secured from the Stockholm harbor department a site of 210,000 sq. ft. located on the Hammerbycreek, and an option on an additional 105,000 sq. ft. which may be needed for extensions.

Swenska Dagbladet reports that the Stockholm establishment is not to be merely an assembling plant, like that operated by General Motors at Copenhagen, Denmark, but a manufacturing plant, although only the Chevrolet is to be completely manufactured in Sweden while the other cars of the corporation, the Cadillac, Buick and Oakland, are to be assembled there or kept in stock.

It is said to be planned to manufacture various parts and accessories in Sweden, particularly automobile chassis springs, for which Sweden possesses the raw material in excellent quality.

G.M.A.C Sells Bond Issue

NEW YORK, Jan. 31—A $50,000,000 offering of General Motors Acceptance Corp., 10-year sinking fund, 6 per cent debentures is being made today.

The debentures, dated Feb. 1, 1927, are being offered at 100 and accrued interest. They will be subject to redemption for the sinking fund, beginning Aug. 1, 1928, in the amount of $1,000,000. The total redeemable increases $1,000,000 each succeeding Aug. 1 until 1932, remaining at $5,000,000 the next three years following and totaling $10,000,000 on Aug. 1, 1936, and Feb. 1, 1937. The redemption price in 1928 will be 104 per cent, decreasing ½ per cent each succeeding redemption date until 1936.

Price Not Making Sales, Says Jordan

Prosperous Conditions Make Other Factors Most Desired, He Tells Dealers

CHICAGO, Jan. 29—Efforts to sell automobiles by talking price and talking about a competing make, rather than the make the salesman represents, will have no place in the tactics of salesmen in 1927 if they follow the advice given members and representatives of the Chicago Automobile Trade Association in the Gold Room of the Congress Hotel last night by Edward S. Jordan, president of the Jordan Motor Car Co., and Alfred Reeves, general manager of the National Automobile Chamber of Commerce.

"The public is not thinking price and long terms today," Mr. Jordan said. "What the public wants is appearance, comfort, power and other things representing real value in transportation. It is a prosperous public and wants to know if you have those requisites in your car. You who talk price and long trade are all wet. You are dealing today with a new clientele, a new group of people and the salesman who knows his groceries will not make an issue of price and long trade."

Building of skyscraper districts does more to hamper the efficiency of automotive transportation than any other agency, Mr. Reeves declared. He spoke of skyscrapers as a most vital element of the traffic congestion problem. The way to improve the used car problem, Mr. Reeves said, is to come to a better understanding with the customer, sell the new car before talking trade, and establish honesty in the policies of this department.

Industry Pays 4.1% of Income Tax Total

WASHINGTON, Feb. 1—Income tax collections in the United States in the calendar year 1926 totaled $2,172,127,321 and of this sum $88,920,180, or 4.1 per cent, was collected from the automobile industry, figures just announced by the Treasury Department show.

The 1925 excise tax collected from the automobile industry was $111,984,828, or 6.13 per cent of the total tax collected which was $1,825,704,135.

Bock Plant Auctioned

TOLEDO, Feb. 1—Bock Bearing Co. plant here has been sold to the Monarch Machinery Co. of Philadelphia, by the Timken Roller Bearing Co., which recently bought the Bock company and centered its activities at the Timken plant in Canton. Representatives of the Monarch company said the plant had been bought on speculation and that it would not be operated by the purchaser. The purchase price was $190,000.

Men of the Industry and What They Are Doing

Frazer and Munroe Are Promoted to New Posts

J. W. Frazer has been appointed sales manager for the United States of the Chrysler Sales Corp. and is succeeded as director of sales by S. W. Munroe, who has been assistant director of sales, announcement of the changes being made by J. E. Fields, vice-president in charge of sales.

Creation of the new position and the rearrangement of duties is designed to effect a more intimate personal contact between the sales organization and the sales manager, and to give Mr. Fields more time to confer and plan with the management on future business development.

Moskovics on Western Trip

F. E. Moskovics, president of Stutz Motor Car Co. of America, Inc., who was on hand Saturday for the opening of the Chicago Show, departed this week for the Pacific Coast where he will spend several weeks visiting Stutz distributors and dealers in San Francisco, Portland, Seattle, Spokane, Los Angeles and other cities. After leaving the Pacific Coast he will stop in Salt Lake City and then will spend two or three weeks on the southwestern deserts, where he will subject Stutz cars to very severe tests.

Woodward Leaves Lycoming

Robert C. Woodward has resigned as metallurgist and chief chemist for the Lycoming Mfg. Co., to join the Westinghouse Air Brake Co. at Milwaukee. For the past seven years Mr. Woodward had been identified with Lycoming and prior to that was with the Sweet Steel Co. In his new position he will be metallurgist and chief chemist with the National Brake & Electric Co. and the National Steel Foundries, both of which are a part of the Westinghouse Air Brake Co.

Blue Devils Honor Thompson

C. E. Thompson, president of Thompson Products, Inc., has been made an honorary officer of the 22nd Battalion of Alpine Chasseurs in recognition of his part in aeronautical and automotive progress. One other honorary commission was given at the same time, the second going to King Ferdinand of Roumania.

Murdy Joins G. M. Export

C. A. Murdy, for the past two years attached to the Washington office of the National Automobile Chamber of Commerce, handling export and tariff matters, has accepted a position with the General Motors Export Co. of New York City. Prior to his affiliation with the N. A. C. C. Mr. Murdy was connected with the American Railway Association.

SCHNEIDER WINNER AWARDED 200,000 LIRE

WASHINGTON, Feb. 3—For winning the Schneider cup from American aviators, Nov. 13, Major Mario de Bernardi, of the Royal Italian Air Force, has been awarded 100,000 lire and was appointed a lieutenant-colonel in Italy's air forces, the War Department has been advised. A like sum was also paid to Major Bernardi by the Macchi Airplane Co. and the Fiat engine firm, builders of the plane which won the race.

U. S. Rubber Promotes Lemon

B. J. Lemon, who for the past 12 years has served progressively in the general research laboratories, sales, technical service and tire manufacturing divisions of the U. S. Rubber Co., has been promoted to the position of field engineer representing the tire division development department. His headquarters will be in Detroit.

General Jamieson Resigns

General C. C. Jamieson, chairman of the board of the Kelly-Springfield Truck & Bus Corp., has resigned and will spend the rest of the winter in Florida. General Jamieson took charge of the Springfield plant shortly after the property was purchased at receivers' sale more than a year ago.

Dodge to Enter Race

Horace E. Dodge, Detroit motor boat manufacturer, and son of one of the founders of Dodge Brothers, Inc., has placed an order for a Bugatti 91½-in. racing car with which he will compete in the forthcoming Indianapolis 500-mile race.

Hicks and Babcock Sail

George D. Babcock and R. Carl Hicks of the Dodge Brothers organization, are en route to Europe on a several months' trip on which they will visit France and Germany and possibly Czechoslovakia and Poland.

Star Dealers Meet

CHICAGO, Jan. 29—One of the first affairs of Chicago show week was the Star dealers' meeting last night at the Palmer House. This meeting was attended by more than 100 Star dealers of Cook County and northern Illinois. It was presided over by J. F. Beebe, district manager and the speakers were: T. E. Jarrard, Great Lakes regional sales manager for Durant Motors, Inc., and Zac Dunlap, special representative from the New York office. Plans for sales in 1927 were discussed and dealers were instructed in sales features.

White Names Managers in Three New Districts

The White Co. has created a new district through the separation of Brooklyn territory from the New York district and has made W. M. McDaniels, formerly Brooklyn division manager, district manager, with F. H. Laning of the Cleveland home office, assistant district manager.

Two new direct factory service stations have been opened at Shreveport, La., and at Amarillo, Texas, bringing the total number of White fields offices to 84. G. E. Sears is in charge at Shreveport and W. D. Phipps in Amarillo. A new building has been opened at Fresno, Cal., and a new one will be built at Syracuse, N. Y.

Niles Appoints Peirce

Edwin H. Peirce has been appointed vice-president and general manager of the Niles Tool Works Co. at Hamilton, Ohio, where he also will be assistant to J. K. Cullen, president. The Niles Tool Works Co. is a division of the Niles-Bement-Pond Co. Mr. Peirce has been connected with the American Steel & Wire Co. for 19 years, for the past two years being superintendent of the Worcester, Mass., plant.

Sales Executives Change

J. L. Kemmer has resigned as sales manager of Hartford Machine Screw Co. On March 1 he will assume the sales manager post at the Sesamee Co., Hartford, manufacturer of combination locks. Mr. Kemmer will be succeeded at Hartford Machine Screw company by L. M. Church, formerly sales manager of the Automatic Refrigeration Co., Hartford.

Ryan Chicago Manager

General Plastics, Inc., manufacturer of Durez, a synthetic plastic molding compound, has opened a Chicago office at 9 South Clinton Street, with Thomas A. Ryan as manager.

Overland Institutes 10-Year Loyalty Club

CHICAGO, Feb. 1—A Willys-Overland 10-year loyalty club was instituted here this week by the initiation of 131 men who have been connected with the Overland Motor Co., the Chicago factory branch, for 10 years or longer. The ceremony was held at the branch building and was presided over by G. V. Orr, president of the Overland Motor Co. John N. Willys, president of Willys-Overland Co., also attended the ceremony and made a short talk.

Mr. Orr announced that 43 of the 229 Willys-Overland dealers in the Chicago territory have been with the organization for 10 years or longer—a record which he believed was excelled by only one other Chicago organization.

Industry Extends Orders for Steel

Buyers in Market for March Requirements—See Prices Holding Low

NEW YORK, Feb. 3—Automotive demand for steel products continues to broaden. Leading motor car manufacturers as well as parts makers have placed orders for fair-sized tonnages of finished stock, and continue to cover their raw material requirements consistent with their February operating schedules. Some automotive consumers have covered part of their March requirements while others are sounding the market with a view to placing this business before the end of the week.

The outstanding topic of discussion is the splendid showing which most of the large steel producers have been able to make in their 1926 reports. Unquestionably the strategic position of buyers has been strengthened, and nothing short of a miracle could bring about a condition in which producers could justify a general rise in the steel market's price structure at this time.

What steel producers hope for is that the intensive scramble that has set in for each order that overhangs the market, will gradually give way to more orderly conditions. Consumers, too, feel that what are referred to as price concessions on individual orders are really recessions in the market price, having become the rule rather than the exception, and that, therefore, the atmosphere would be cleared by quotations that really represent the market.

Non-integrated sheet-rollers have been helped to some extent by sheet-bar prices more in line with the sheet market than they were a few months ago, but mills specializing in full-finished body stock complain that not only has the decline in sheet prices been more acute than that in the market for their semi-finished material, but that consumers have grown more exacting in point of quality than ever before.

Pig Iron—Blast furnace interests and selling agencies emphasize to consumers the "rock bottom" prices at which they can insure themselves at the present time against the possibilities of a sharp rise in the event of a coal strike. Automotive foundries, however, are covering their wants strictly with sole consideration to their operating schedules. Dumping of German pig iron in the seaboard markets, as substantiated by the Secretary of the Treasury, has had only an indirect effect on the interior markets in the Michigan and Ohio consuming centers. The Chicago market declined 50c.

Aluminum—It is intimated in some quarters that one of the objects of the recent reduction in the sole domestic producer's price was to quicken automotive consumption of the metal. Import manifests show that the greater activity of Germany as an exporter of aluminum is largely in the direction of more highly finished products than ingots, especially foil. Market prices and conditions are unchanged.

Copper—The market rules quiet and easy.

Tin—Consumers buy moderately on breaks in the market.

Lead—Good demand is noted from storage battery makers at the inviting prices

Rubber Releases Reduced 10 Per Cent

NEW YORK, Feb. 1—Dispatches received here today by the Rubber Association of America, Inc., from London announce that the British Colonial Office has fixed the percentage of crude rubber which will be exported from Ceylon and Malaya for the quarter beginning Feb. 1 at 70 per cent of the standard production. This additional 10 per cent restriction in crude rubber is due to the automatic provisions of the Stevenson restriction act, that if the average price of crude for the restriction quarter just ended fell below 42 cents a pound the exportable quantity would be reduced. Prices in the last quarter have averaged 39 cents a pound and, accordingly, the restriction occasioned no surprise in the New York rubber market.

This restriction will cut down the exportable Far Eastern rubber supply by 10,000 tons. Supplies here, however, are adequate and London stocks are very large.

Hare & Chase Now Under New Control

NEW YORK, Feb. 3—Control of Hare & Chase, Inc., has passed into the hands of the Royal Indemnity Co. of New York, it was learned this week, when interests associated with the indemnity company agreed to advance $4,000,000 to Hare & Chase to liquidate frozen automobile credits and keep the corporation going.

Steps toward the organization of a preferred stockholders' committee will be considered at a meeting called this week by representatives of preferred stockholding groups.

Operations of Hare & Chase were reported handicapped by curtailment of its resources due to its holding certain assets which could not be liquidated immediately. With the new money made available the company is continuing business as usual.

Gramm Increases Capital

DELPHOS, OHIO, Feb. 1—Stockholders of Gramm Motors, Inc., at the annual meeting here, have voted to increase the capital stock $150,000 to provide working capital for the handling of several large contracts recently awarded. Officers and directors were re-elected for the ensuing year.

The report on 1926 business was regarded as gratifying and business already contracted for in 1927 is four times larger than 1926 business.

Excise Tax Repeal Fails of Support

Measure Now Regarded as Dead Until Congress Reconvenes in December

WASHINGTON, Jan. 29—The last faint hope for further repeal of the remaining 3 per cent excise taxes on passenger cars, at the present session of Congress, was given up this week, when the final attempt of the Democrats to force tax reduction was blocked by Republican House and Senate leaders.

It was conceded almost at the outset that tax reduction had no chance, with a Republican majority opposed to it, but the effect of this week's bickering was a successful move by the Democrats to place the blame on the Republicans. Of the 182 Democrats in the House, 176 signed a petition to reduce the taxes. The measure failed in the House by a needed support of 36 votes.

Reduction in the House was attempted by tacking an amendment on to the $184,000,000 deficiency bill. Following the defeat of the amendment, the bill was passed and went to the Senate. A Senate amendment was there tacked on by Senator Harrison (Dem.) of Mississippi, asking for the 3 per cent tax repeal, and it was finally stricken out—after an hour's debate—on motion of Senator Warren (Rep.) of Wyoming, chairman of the Senate Committee on Appropriations, thus killing off the last and only chance of reduction at this session. The next session will be in December, with the reconvening of a new Congress.

P. R. T. Orders 218 Buses, May Supplant Trolleys

PHILADELPHIA, Feb. 3 — The Philadelphia Rapid Transit has placed an order for 218 gasoline-electric buses, to cost more than $2,720,000, with Yellow Truck & Coach Mfg. Co. Dillon, Read & Co. will issue $1,900,000 in equipment trust certificates in connection with the bus order. The order calls for 100 single-deck buses, 50 double-deck, 51 parlor car buses and 17 smaller service units.

The P. R. T. at present operates 362 buses. The new buses are regarded as a step in the plan of the company to substitute buses for trolleys in the central section of the city.

N.A.C.C. Handbook Out

NEW YORK, Feb. 3—The 1927 Handbook of Automobiles, prepared by the National Automobile Chamber of Commerce, has just been published. Specifications are given of 178 motor vehicles and 786 models are listed, the products of manufacturers who are members of the chamber. All vehicles are gasoline driven except 11 electric commercial cars.

TRADE WAITS SHOWING OF 1927 CARS

(Continued from page 170)

sales policies, which in some degree is probably responsible for slow early year car movement.

Reports from leading trade centers on January developments follow:

NEW YORK

While definite figures on new car registrations during the first three weeks of January are not yet available, representative dealers report that sales were materially better than in December and on a par with or slightly less than in January, 1925. Actual sales at the automobile show probably were less than a year ago, but the interest displayed by prospects and the number of demonstrations given then and since were encouraging. Sales of trucks and commercial cars have been especially satisfactory, particularly during the second and third weeks of the month.

CHICAGO

Despite a tendency on the part of many prospective buyers to put off new car purchases until after the Chicago show January's business for the trade at large in this zone registered an improvement over December and compared favorably with January of 1925. Several of the larger volume dealers report that it was a "normal" January, with some of this class reporting not only materially better business than in December but better than January of last year. Dealers generally look for a better pick-up within the next few weeks and a fairly active February. There has been quite a tendency to book orders for spring delivery. The movement of used cars has been normal with stocks about at the same level as last month at this time.

BOSTON

Distributors and dealers in Boston, and those outside are looking forward to some real good business beginning in February. The January sales curve compared to January of 1926 has been down on an average of about 50 per cent. On the other hand the orders booked now for delivery in April are climbing so that in a number of cases they much more than compensate for the January losses. Outside dealers are accepting cars for spring delivery in larger numbers. In a few weeks Washington's birthday will break open the spring selling season. Then there will follow in two weeks the opening of the Boston automobile show.

DENVER

Business in the first half January was extremely slow for both cars and trucks in Colorado. The last half of the month made great improvement so that the month equalled January last year. New models are finding favor, collections are better and dealers anticipate a boom after the automobile show in February.

CLEVELAND

January automobile sales, so far as the distributor and dealer are concerned, were at a par with December which was the poorest month for sales in years. However, dealers were busy all month preparing for the twenty-sixth annual show which which was held the last week of the month. While sales figures are not yet available all reported a decidedly satisfactory business with every indication that spring sales will exceed all previous years and offset the poor business which has been characteristic of the past three months. The used car market is not active, but naturally will quickly revive when the better weather returns.

DETROIT

Automobile dealers in Michigan are entering February with the expectation that the month will show an appreciable gain over January in automobile sales. Keen interest on the part of the public in various cars exhibited at the automobile shows and the fact that employment conditions in the large industrial plants of the state are improving, give car dealers every good reason to believe that their business will show an improvement. The Detroit show attracted the largest crowd in its history and dealers report that a very large number of people appear to be in the market for new automobiles. The used car situation is giving some dealers considerable concern.

ATLANTA

The new year has opened up on a good basis with automotive sales in January about equal to those of the same month last year. Distributors and dealers are confident they will have at least a normal business this spring. Ford and Chevrolet dealers had particularly good business this month with sales exceeding last year by a comfortable margin and the spring outlook very good. Dealers handling medium priced cars had about normal January sales and look for normalcy to continue, as a greater diversified crop program than usual in the South last year has offset low cotton prices.

ST. LOUIS

Sales have been dull in the St. Louis district since December 15 and January sales have been 10 to 15 per cent below those of January, 1926. Weather conditions have been bad, which is the principal reason for the depression. Used car sales are few and stocks of used cars are about 10 per cent above normal at this time. Automobile men are not worried over the condition of the market and are stocking up with new cars in preparation for the return of good business after the annual show is held here next month.

NEW ORLEANS

January sales decreased approximately 37 per cent under last month and 8 per cent under January, 1926. However, the introduction of new models in the latter part of the month has stimulated business noticeably. Tire and automotive accessory business shows that there has been a decline of about 6 per cent in business under last month. In the truck field there has been a decline of around 17 per cent from last month, and a decline of about 4 per cent from the same period last year. An analysis of the used car market shows that dealers as a whole are in better shape than last month, and in considerable better shape than in January, 1926, due to conservative policies.

DALLAS

Bad weather, inventory season and late arrival of new models combined to reduce January sales in automotive lines in Texas and parts of adjoining states below those of December, and probably a little below those of the same month a year ago. Money was comparatively easy, but most all lines of business were slow and the automotive lines shared in the slump. Dealers and jobbers were optimistic, however, and said sales would begin to hum with better weather. New lines of automobiles are now being displayed in most places and have created a very favorable impression. Used car sales were 15 to 17 per cent lower than for December and some 10 per cent less than January a year ago. Dealers are carrying heavy stocks and have reduced prices to what they say is "bed rock."

SAN FRANCISCO

While figures for January automobile sales are not yet available, dealers and officials of trade association believe they will be little if any above those of December for this territory and not more than 10 or 15 per cent above those of January last year. Double usual annual rainfall and the approach of March tax day have acted as sales resistance, but dealers believe early annual San Francisco show will reduce this. Widespread rebuilding of used cars with mileage guarantees has helped to improve used car business, but is reducing new car sales.

LOS ANGELES

January sales for southern California are running about 10 per cent under January last year and about the same as last month. The tendency to hold off until Los Angeles show, scheduled for next month, is more pronounced than in previous years. Agricultural conditions are not wholly satisfactory as several crop failures reported. Used car stocks are being reduced. Truck sales continue slow, running under January of last year and about even up with last month. Market still heavy with used trucks.

SEATTLE

Annual survey of sales shows practically every dealer in Seattle and the Pacific Northwest increased sales from 3 to 35 per cent in 1926 over 1925, with the largest increase in cars retailing for $1000 to $2000. Dealer surveys indicate that the Pacific Northwest will buy more cars the first quarter of 1927 than the same period of 1926, and January business was ahead of a year ago. Cities like Seattle are showing a substantial increase in population and added to this is a more general use of automobiles in this section, as roads rapidly are being improved and dealers are getting over their two cars per family campaign.

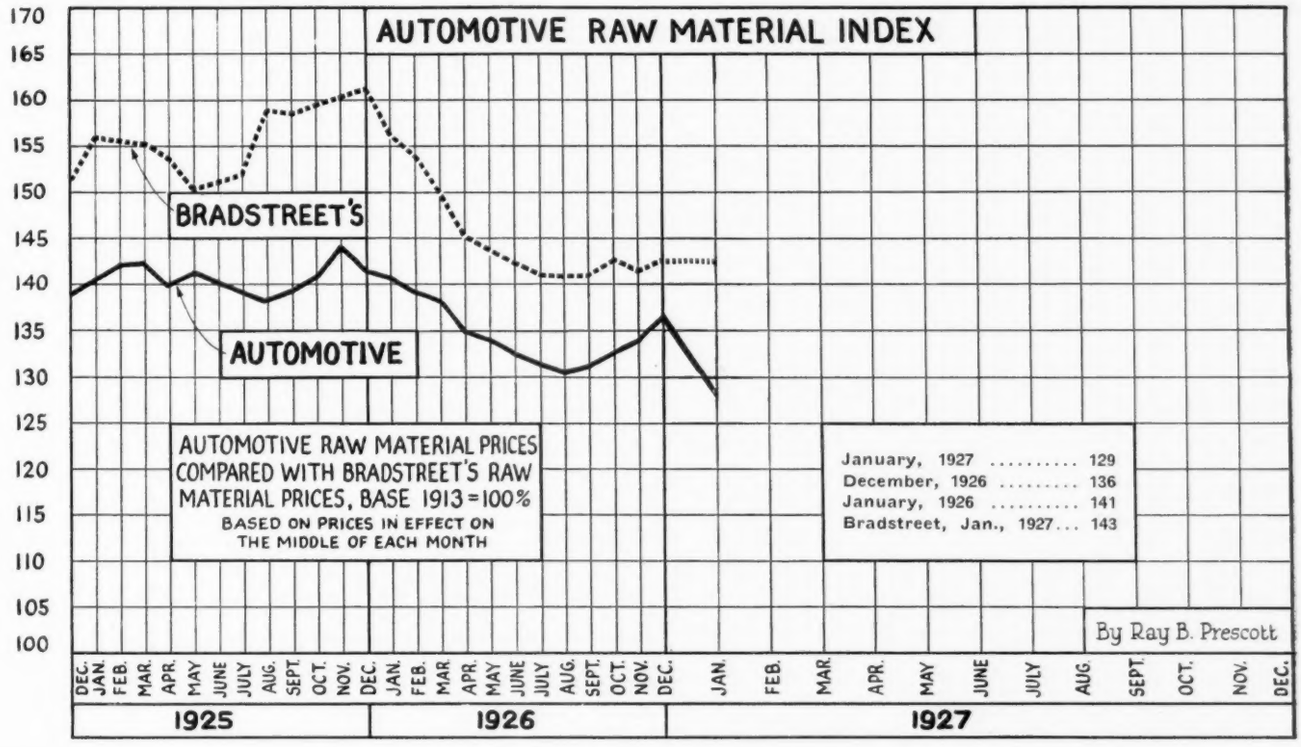
MILWAUKEE

The results of the annual Milwaukee show fully met expectations of distributors and dealers. The consequence has been that the Milwaukee and Wisconsin passenger car trade looks forward to the immediate future with optimism. Since the show, new car sales have picked up appreciably in comparison with the immediate pre-show period and December, but business may hardly be called as good as a year ago. Sales of cars ranging from $1500 and upward are fully holding their own, but it is the lower priced merchandise that is at present moving slowly.

MINNEAPOLIS

Minneapolis territory automobile business has been on the gain since Jan. 1. The outlook is good for early spring business. The prospects are better for Minnesota than the other states, good for North Dakota except in spots, good for Montana, but not so good in South Dakota. An evidence of probabilities for good business as spring opens is the uniform optimism of dealers throughout.

Raw Material Prices Decline Sharply



J. W. Johnson Dies After Operation

KOKOMO, Jan. 31—J. W. Johnson, head of Kokomo's "Seven Allied Industries" and the foremost industrial leader of this part of the state, died Sunday, following an operation. Returning early in the week from a business trip to Detroit, Mr. Johnson was taken ill, but his condition was not regarded as serious until Friday. The funeral was held Feb. 2.

Pioneered in Castings

Through the Kokomo Brass Works, early in his meteoric rise, he pioneered in the making of brass, bronze and aluminum castings for automobiles. His genius for organization and manufacturing is back of the success of Byrne, Kingston & Co., and he has been very closely connected with the Kokomo Electric Co., an allied concern. Under his direction, the original group of three organizations was expanded to include four others: The Hoosier Iron Works, the Kokomo Malleable Iron Works, the Kokomo Stamped Metal Co. and the Kokomo Lithographing Co., all but the last being directly connected with the automobile industry.

Policies to be Continued

Throughout the years of his manufacturing activity, Mr. Johnson was associated with Charles T. Byrne, now living in Chicago, and George Kingston, of this city and Fort Myers, Fla., in most of his ventures. Although no successor has been named to take his place as directing head of the group of industries, company executives have announced that there will be no change in the directing personnel or in the policies of the concerns.

A.E.A. Names Stettinius to Merchandising Board

CHICAGO, Jan. 31—W. C. Stettinius, president of the American Hammered Piston Ring Co., has been appointed a member of the merchandising committee of the Automotive Equipment Association. He fills the vacancy made by the resignation of T. H. Quinn, of the National Lamp Works of General Electric Co. from that body. Mr. Quinn's recent promotion by General Electric withdraws him from the automotive activity of that corporation. Mr. Stettinius was elected president of the National Standard Parts Association at its meeting here last November and has served in the past on the service parts committee of the A. E. A.

Johnstown Names Directors

JOHNSTOWN, PA., Feb. 2—The stockholders of the Johnstown Tire & Rubber Co. at their annual meeting last week, reelected the old members of the board of directors and elected two additional members, Fred G. Smith and Walter W. Krebs. The old members, who were reelected, are Harry Swank, H. F. Berkebile, James N. McKee, Edward G. Strauss, J. E. McKelvey, Max Schwartz and Edgar F. Waite. The officers are: President, H. F. Berkebile; vice-president, Edgar F. Waite; secretary and treasurer, Harry Swank.

Stutz 1926 Sales Show Large Gain

INDIANAPOLIS, Feb. 1—Stutz Motor Car Co. of America, Inc., reports business in 1926 increased 39 per cent over the best previous year in the company's history and 385 per cent over 1925. As result of business developed at the New York national show and at local shows thus far held the company is proceeding on a larger production schedule than in the early part of 1926.

Despite a more conservative tendency exhibited in buying at the shows this year as compared to last, E. S. Gorrell, vice-president, reports a larger volume of actual sales at the New York show than at any previous New York show. Indications point to an increasing interest in the Stutz line, he declared.

Former Aide Sues Ford

DETROIT, Feb. 1—Suit for $2,000,000 has been filed here against Ford Motor Co. by Antonio F. Ajalich, who asserts he was refused royalties and other moneys promised for patents perfected during six years with the company. Mr. Ajalich is now proprietor of a sheet metal plant.

Ford Company Enjoined

SAN FRANCISCO, Jan. 31—Ford Motor Co. has been perpetually enjoined from using a spraying device in finishing motor parts, which Blake Hopkins, local paint contractor and inventor, claims it was using without authority. The case has been referred to a federal examiner for determination of damages.

Dodge 1926 Earnings Total $27,793,673

Sales Volume Shows Gain of $36,156,116 — Graham Makes All Trucks

DETROIT, Jan. 31—Earnings of Dodge Brothers, Inc., for 1926 were $27,793,673 after depreciation but before interest and taxes, as against $28,698,846 in 1925, the latter figure including $654,811 profit on real estate sold. Sales in 1926 were $252,997,484 as against $216,841,368 in 1925.

Earnings after charges and dividends on preference stock were $15,729,419 in 1926, equal to $6.46 a share on the 2,435,000 shares of Class A and B common stock, against $4.04 a share for the eight months of operations in 1925 and against $6.32 a share for 1925, including the earnings of the predecessor company exclusive of the profits from real estate.

The ratio of current assets to liabilities was 3.89 to 1 in 1926 against 2.79 to 1 in 1925. Cash and securities in 1926 totaled $30,539,450 compared with $27,176,042 in 1925. Inventories of $14,363,398 compared with $17,197,169. Earned surplus increased from $9,841,969 to $25,571,388. Total surplus was $47,229,607.

In his annual report, E. G. Wilmer, president, said total sales of all vehicles in 1926 were 331,764 against 259,967 the year previous. Under a change in policy all commercial vehicles in the future will be made by the Graham Brothers division.

Exports in 1926 totaled 39,016 as against 33,945 in 1925. Canadian sales were 6142 against 3379 in 1925. Exports of Graham Brothers trucks in 1926 were 6714 against 4651 in 1925.

Sikorsky Thought Buyer of Springfield Factory

SPRINGFIELD, MASS., Feb. 1—Land and buildings of the bankrupt Springfield Body Corp. were bought at public auction today for $81,000 by A. C. Dickinson, of Fitchburg, Mass., who is believed to have acquired it for the Sikorsky Mfg. Co., of College Point, L. I. The Columbia Aircraft Corp., of New York, was a competing bidder.

The plant, considered as well planned as located, has a railroad siding of 77,000 sq. ft. of floor space and five acres of land. Manufacturing building is of brick and structural steel and is U-shaped. Sikorsky representatives have all along insisted that the city must establish an airport as a condition to its plant being located here. An influential citizens' committee has taken this project in hand.

Revive Olympia Truck Show

LONDON, Jan. 18 (*by mail*)—The opening of the 1927 Olympia passenger car show has been put forward a week in comparison with last year. The dates just announced are from Oct. 14 to 22 for the public, with a press and dealers' view on Oct. 13. The truck show at Olympia will run from Nov. 17 to 26, after an interval of two years, the last one having been held in 1925. The embargo on German exhibits will be lifted for the first time since the war at both shows.

DuPont 1926 Income Totals $41,969,574

WILMINGTON, DEL., Feb. 1—Net income of the E. I. duPont de Nemours & Co. in 1926 was $41,969,574 as against $24,033,957 in 1925. This is equivalent to $13.98 a share in 1926 as against $7.49 in 1925. Income from operations totaled $14,803,724 and $13,413,193 in 1926 and 1925 respectively; income from investment in General Motors Corp., $23,621,946 as against $9,296,705 in 1925, and income from miscellaneous securities, $4,889,900 against $2,668,535 in 1925.

The company paid total dividends of $38,037,471 in 1926 as against $15,509,760 in 1925, the surplus account at the end of the year standing at $66,417,566, against $62,669,541 a year earlier.

Current assets as of Dec. 31 totaled $73,834,552 against current liabilities of $14,534,540. Current assets included cash $17,307,028, securities and call loans $18,364,816, accounts receivable $14,251,981, and inventories $23,305,504.

Mid-West Dealer Stocks Cut 20% in December

CHICAGO, Jan. 31—Reports to the Chicago Federal Reserve bank from automobile dealers indicate that dealers in the Middle West entered the new year with new car stocks exceeding by 4.9 per cent new car stocks on hand Jan. 1, 1926. Used car stocks showed an increase of 0.6 per cent. New car stocks were reduced 20.1 per cent from the November total and used car stocks increased 1.6 per cent over the November total.

Auburn Nets $943,262

CHICAGO, Feb. 3—Auburn Automobile Co. and subsidiaries report net profits of $943,262 for the 11 months ended Nov. 30, 1926, equivalent to $11.11 a share on the 84,888 outstanding shares of $25 par value common stock. After dividends aggregating $256,703, the surplus of Nov. 30 was $686,559. Net earnings for all of 1925 were $755,685 or $12.42 a share. There was a deficit of $37,951 in 1924.

Franklin Net $72,381

SYRACUSE, Feb. 1—H. H. Franklin Mfg. Co. preliminary statement for the year ended Dec. 31, 1926, shows net profit of $72,381 after charges, depreciation, taxes, etc., comparing with $2,019,170 in 1925. Cash and marketable securities totaled $1,973,498. Decline in net profits is due to price cuts on Franklin cars, it was stated.

Financial Notes

Pratt & Lambert, Inc., reports net profits of $1,339,503 for the year ended Dec. 31, 1926, equivalent to $6.61 a share on the 202,500 shares of no par common stock. Total of current assets as of Dec. 31, 1926, was $4,241,296 against current liabilities of $973,274. Surplus totaled $2,199,678. Directors have declared a dividend of 75 cents a share on the common stock, payable April 1 to stock of record March 15.

Mullins Body Corp. reports net earnings in 1926, after all charges but before Federal taxes, of $301,090 against $317,745 in 1925. Allowing for Federal taxes a net profit of $260,443 is indicated, equivalent after preferred dividends to $1.83 a share earned on the 100,000 no-par shares outstanding. This compares with actual net of $276,639 in 1925, or $1.99 a share.

Chicago Pneumatic Tool Co. income account for 1926 shows not only record earnings of $1,226,873, or $12.74 a share, on capital stock but a gain in earnings in the fourth quarter. Profits for the December quarter were $530,661, or $5.28 a share, against $2.57 in the third quarter and $2.44 in the closing quarter of 1925.

Stewart-Warner Speedometer Corp. reports for year ended Dec. 31, 1926, net income of $5,108,886 after charges and taxes, equivalent to $8.51 a share earned on outstanding 599,990 no par shares of stock. This compares with $7,544,089 or $12.57 a share in 1925.

B. F. Goodrich Co. declared the regular quarterly dividend of $1 on common and two dividends of $175 each on the preferred. Common dividend is payable March 1 to stock of record Feb. 15 and the preferred dividends April 1 to stock of record March 15, and July 1 to stock of record June 15.

Federal Motor Truck Co. has declared the regular quarterly dividends of 2½ per cent in stock and 20 cents in cash. Cash dividend is payable April 1 to stock of record March 19 and the stock dividend April 5 to stock of record March 19.

Studebaker Corp. declared regular quarterly dividend of $1.25 on common and $1.75 on preferred stock, payable March 1 to stock of record Feb. 10.

A. O. Smith Corp. declared the regular quarterly dividend of $1 on the common stock, payable Feb. 15 to stock of record Feb. 1.

Marmon Motor Car Co. has declared regular quarterly dividend of $1 on common, payable March 1 to stock of record Feb. 15.

Fisk Rubber Co. has declared the regular quarterly dividend of $1.75 on second preferred, payable March 1 to stock of record Feb. 15.

Timken Roller Bearing Co. has declared an extra dividend of 25 cents a share and the regular quarterly dividend of $1.

Martin-Parry Corp. declared the regular quarterly dividend of 50 cents, payable March 1 to stock or record Feb. 15.

Exports, Imports and Reimports of the Automotive Industry for December of 1926 and Total for Twelve Months Ending December, 1926

	Month of December				Twelve Months Ending December			
	1925		1926		1925		1926	
	Number	Value	Number	Value	Number	Value	Number	Value
Automobiles, parts and accessories (total)..	..	$31,734,764	..	$25,255,682	..	$318,385,970	..	$320,166,335
Electric trucks and passenger cars.....	14	19,903	15	25,326	128	195,506	108	155,688
Motor trucks and buses, except electric:								
Up to 1 ton, inclusive, and Valued up to $800, inclusive.....	7,134	2,634,279	2,408	957,972	43,438	16,163,824	49,544	21,090,272
Value over $800	287	313,895	165	205,862	3,065	3,276,626	2,556	2,971,159
Over 1 and up to 2½ tons.....	1,252	1,689,184	1,108	1,505,103	10,423	13,013,936	12,409	16,000,579
Over 2½ tons	228	753,399	177	583,946	1,699	5,249,016	2,266	7,017,414
Total motor trucks and buses, except electric	8,901	5,390,757	3,858	3,252,883	58,625	37,703,402	66,775	47,079,424
PASSENGER CARS								
Passenger cars, except electric:								
Value up to $500, inclusive.....	11,872	4,486,168	8,687	3,544,564	100,230	37,169,599	98,032	38,133,392
Value over $500 up to $800.....	4,890	3,344,951	6,739	4,574,818	60,448	42,918,936	67,182	46,055,410
Value over $800 up to $1200.....	6,103	6,423,159	5,083	5,262,483	59,848	62,830,910	56,273	59,323,841
Value over $1200 up to $2000.....	1,270	1,886,732	711	1,127,028	18,565	27,746,946	11,217	17,270,405
Value over $2000	484	1,301,436	585	1,582,982	5,215	14,219,439	5,777	15,698,254
Total passenger cars, except electric.....	24,619	17,442,446	21,805	16,091,875	244,306	184,885,830	238,481	176,481,302
PARTS, ETC.								
Parts, except engines and tires for Automobile unit assemblies	..	3,854,387	..	1,678,530	..	42,486,859	..	38,584,112
Automobile parts for replacement.....	..	3,279,888	..	3,219,888	..	29,213,307	..	36,064,524
Automobile accessories	..	753,189	..	660,363	..	8,611,000	..	9,279,096
Automobile service appliances (n. e. s.).....	..	407,002	..	479,572	..	5,432,711	..	6,861,746
Station and warehouse motor trucks.....	14	16,518	16	6,714	248	193,970	175	178,405
Trailers	93	23,362	48	14,027	623	281,513	1,002	347,300
Airplanes	3	53,329	14	136,640	80	511,282	50	303,149
Parts of airplanes, except engines and tires	..	1,835	..	17,244	..	101,584	..	150,329
BICYCLES								
Bicycles and tricycles	789	26,838	514	12,124	7,710	209,803	5,348	150,567
Motor cycles	2,385	509,130	1,852	395,812	22,845	5,079,939	22,670	4,915,949
Parts, except tires	..	167,848	..	96,226		1,668,445		1,707,398
INTERNAL COMBUSTION ENGINES								
Stationary and portable: Diesel and Semi-Diesel	115	76,251	156	107,505	1,289	858,574	894	1,586,821
Other stationary and portable:								
Not over 10 HP.....	2,382	200,307	2,311	213,505	28,631	2,447,855	33,322	3,175,226
Over 10 HP	104	139,907	140	129,007	2,481	2,325,720	2,840	2,571,814
Automobile engines for:								
Motor trucks and buses.....	2,564	215,279	619	62,536	41,571	3,550,061	4,268	596,591
Passenger cars	7,916	778,915	1,947	264,281	104,277	11,740,005	114,160	11,925,598
Tractors	54	34,469	138	81,506	1,450	613,420	2,251	1,196,584
Aircraft	14	23,351	1	4,500	73	170,793	297	573,732
Accessories and parts	..	352,941	..	315,541	..	4,110,699	..	4,273,298
IMPORTS								
Automobiles and chassis (dutiable).....	38	79,212	75	132,230	678	1,079,560	813	1,352,984
Other vehicles and parts for them (dutiable)	..	96,059	..	6,360	..	85,893	..	151,963
REIMPORTS								
Automobiles (free from duty).....	13	31,522	7	8,318	207	303,879	188	275,519

Automotive Exports Increase $2,000,000

WASHINGTON, Feb. 2—The value of all automotive exports during the calendar year of 1926 totaled $337,500,000, and represented an increase of approximately $2,000,000 over the 1925 exports, figures compiled by the automotive division of the U. S. Department of Commerce show.

There were 379,580 passenger cars and trucks exported, the average price of the passenger car being $740 and of the truck, $705. In 1925 the passenger car average was $757 and the average price of the truck was $643. During the latter year 377,075 passenger cars and trucks were exported, representing an increase of 2505 units in 1926.

The trend of the U. S. export business in passenger cars alone since 1913 and during the past five years, is shown by the following figures:

Year	Number	Value
1913.....	25,580	$23,343,644
1922.....	66,791	51,049,816
1923.....	127,035	90,692,272
1924.....	151,380	112,534,729
1925.....	244,306	184,885,830
1926.....	238,481	176,481,302

Australia taking in 1926, a total of 48,960 passenger cars, valued at $33,999,000, was by 100 per cent the best passenger car market, as well as the best truck and bus market, taking 15,150 units, valued at $10,330,066.

In the passenger car field, Argentina, taking 25,552, was second, others in order named being: Canada, 25,397; Brazil, 16,703; British South Africa, 14,680, and Denmark 10,132.

In the truck foreign field Brazil, was second, taking 5886; United Kingdom, third, taking 4895; Denmark, fourth, taking 3289, and Canada fifth, taking 3043.

Ternstedt Claim Upheld to Door-Check Patents

DETROIT, Feb. 2—Judge Baltzell, in the United States District Court at Indianapolis, has just entered a decree sustaining the several Ternstedt patents on overhead door checks. Overhead door checks put out by the Concealed Door Check Co., of Kokomo, have been held to be an infringement. The decree orders an accounting and an injunction. The patents involved are the Eisman patent 1,398,010, Fauser patent 1,532,239, and Fauser patent 1,574,340.

G.M. Exports Gain 50%

NEW YORK, Jan. 31 — General Motors export shipments are running 50 per cent ahead of last year, said J. D. Mooney, president of General Motors Export Co. sailing on a three months' trip to Europe. The first quarter should show larger shipments than the 1926 first quarter, he said, expressing confidence of the outlook for General Motors sales in all markets.

Tire Exports Show Four Million Gain

WASHINGTON, Feb. 1—Exports of tires, tubes and casings, from the United States last year totaled $33,173,896. Constituting 55.2 per cent of all the rubber goods exported, according to export figures compiled by the U. S. Department of Commerce. The 1926 tire exports amounted to four million more than the 1925 exports and to thirteen million more than the 1924 exports.

The average unit value of casings was $16.27; of inner tubes $2.68, and of solid tires $35.24. In 1925 the average price of casings was $17.86; inner tubes $2.85, and solid tires $36.23.

Kelsey Elects Kennedy

DETROIT, Feb. 3—George W. Kennedy has been elected president and general manager of Kelsey Wheel Corp., succeeding the late John Kelsey. Mr. Kennedy has been vice president and assistant treasurer of the company

Production Increases 57%

CHICAGO, Feb. 3—January production by companies represented in the National Automobile Chamber of Commerce exceeded December output by 57 per cent according to estimate submitted at the directors' meeting here today. Production for January will be about 5 per cent below production in January, 1926.

French Makers Plan Plants in England

PARIS, Jan. 15 (*by mail*)—The Renault Co. announces that it is about to open an assembly plant in England, with a capacity for supplying the British and British colonial markets. Parts will be shipped from the main factory at Billancourt, in the suburbs of Paris. Citroen already has a factory in operation in England and the Michelin Tire Co. will have an English factory in full operation before the end of this year.

A recent ruling of the English customs department whereby the French catalog price, less 30 per cent, will be the basis on which ad valorem import duties will be applied is expected to adversely affect French exports. In the past consular invoices have been accepted in determining the value of cars and, as many French manufacturers had their selling branches in Great Britain, they were able to invoice cars at prices having no relation to the actual selling price on the French market.

Lie Named Distributor of Chrysler in France

PARIS, Jan. 15 (*by mail*)—From Feb. 1 the distribution of Chrysler cars for the whole of France will be in the hands of Christian Lie, who for several years was Buick distributor. An establishment is being opened at Neuilly-sur-Seine, in the western suburbs of Paris, and an important service will be organized with the assistance of experts from the factory. On leaving Buick, Mr. Lie went to Antwerp as assistant to S. D. Briggs, European manager of the Chrysler Corp., but was recently appointed main distributor in order to extend the business in France. St. Didier garage. which originally was Chrysler distributor, remains as a dealer.

White Adds to Unit

CLEVELAND, Jan. 31—White Co. has completed an addition to its engineering building almost doubling the floor space given to engineering and research activities. Included in the new building is a special equipment department in which designs for special purpose vehicles are worked out.

Coming Feature Issue of Chilton Class Journal Publication

Feb. 19—Automotive Industries —9th Annual Statistical Issue.

Plate Glass Cost Survey Ordered by Commission

WASHINGTON, Feb. 2—A survey of cost of production in the United States and in Belgium of plate glass has been ordered by the U. S. Tariff Commission. Figures of the commission show that 53 per cent of all the plate glass manufactured is used in the automobile industry, about one-half of which is shipped to Detroit and used by the manufacturers of automobiles there.

Preliminary figures show that the Belgian glass can be delivered in Detroit for three cents per sq. foot less than the American product. There are 16 factories in the United States producing plate glass. The automobile industry in 1925 used 62,500,000 sq. ft.

Milwaukee Companies Make Export Shipments

MILWAUKEE, Jan. 31—The Kearney & Trecker Corp. has just completed the shipment of 58 medium-sized milling machines to customers in Japan, and is now working on an order for a large unit for the Japanese Navy. The commercial order amounts to more than $85,000.

Other export sales of note made by Milwaukee and Wisconsin manufacturers include a large consignment of gasoline engines for Australian customers by Fairbanks, Morse & Co., Beloit, Wis., and two large gasoline locomotives for Japan by the Milwaukee Locomotive Mfg. Co.

Wrench Company Expands

MILWAUKEE, Jan. 31—The Husky Wrench Co. has taken additional manufacturing space in order to meet the increased demands for its products. John G. Zummach is president and treasurer; Siegmund Mandl, vice-president, and Joseph O. Wirtish, secretary.

National Gauge Unit Increases Capacity

LA CROSSE, WIS., Jan. 31—The National Gauge & Equipment Co. of LaCrosse, Wis., recently acquired by the Moto Meter Co., Inc., has taken occupancy of a large manufacturing addition erected during the past three months and is operating at full capacity. The daily output now includes 3500 instrument panels, 6000 oil gages, 6000 ammeters, 1500 dashboard gasoline gages, 3000 tank gasoline gages, 500 steam gages, 500 oxy-acetylene gages, 35,000 cups and miscellaneous instruments.

Preparations are being completed for taking over the manufacture of the Moto Meter tire tester, a new product, and a schedule calling for an output of 1000 a day will be instituted Feb. 1. Production also will start March 1 on a complete instrument panel unit for one of the largest passenger car builders.

Sales Financing Bank Started in Stuttgart

WASHINGTON, Jan. 31—A bank for the financing of automobile purchases has been opened in Stuttgart, Germany, the U. S. Department of Commerce has been advised. Ownership of the bank is divided equally between the three groups interested in its organization—banking, automobile interests and insurance interests. Motor vehicle sales in southwest Germany have grown from 21,463 in July, 1924, to 45,962 in July, 1926, most of the numerical gain being in motorcycles, though passenger cars doubled and trucks increased approximately 75 per cent.

Denies "Accessibility" Plea

WASHINGTON, Jan. 31—The accessibility of the control on an automatic windshield wiper, is not patentable, under a ruling just made by the Examiners in Chief of the U. S. Patent Office, affirming a similar decision by the Board of Examiners, denying a patent. The board bases its decision on the declaration that what is and what is not "readily accessible" is relative and does not clearly define any construction.

Calendar of Coming Events

SHOWS

Cairo .....Feb. 15-March 15
First International Motor Show.
Copenhagen .....Feb. 18-27
Danish Automobile Exposition.
Geneva .....March 4-13
Palais des Expositions.
Los Angeles .....Feb. 12-19
Annual Salon, Hotel Biltmore.

CONVENTIONS

Automotive Equipment Association Summer Convention, Portland, Ore. .....June 27-July 2
National Foreign Trade Council, Detroit .....May 25-27
National Safety Council, Mid-West Safety Congress, Hotel La Salle, Chicago .....Feb. 21

S. A. E.

Chicago, Feb. 8—High Speed Ignition Systems and Breaker Systems—F. G. Shoemaker.
Detroit, Feb. 17—Electro-Deposition of Rubber—Dr. S. E. Sheppard and J. W. Schade.
French Lick Springs, Ind., May 25-28—Summer Meeting.
Indiana, Feb. 10—Trend of the Industry as Reflected by the New York Show—T. J. Litle and Prominent Engineers.
Metropolitan, Feb. 17 — Buses—R. N. Graham.
New England, Feb. 10—Electric Drive as Motor Bus Transmission—C. Froesch.
Pennsylvania, Feb. 8—What Has Research to Do With Manufacturing—J. H. Hunt, president.
Southern Calif., Feb. 11—Piston Ring Symposium.
Washington, Feb. 10—Rubber and Its Uses —W. L. Holt.

RACES

Abilene, Texas .....July 4
Altoona, Pa. .....June 11
Atlantic City .....April 30
Charlotte, N. C. .....May 9
Fresno, Cal. .....April 21
Indianapolis .....May 30
Los Angeles .....Feb. 22
Los Angeles .....April 10
Salem, N. H. .....June 25